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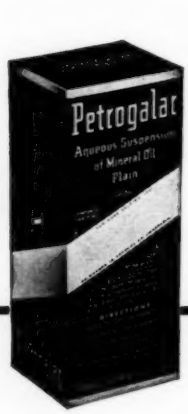

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CHEMOTHERAPY IN EXPERIMENTAL TUBERCULOSIS

WILLIAM H. FELDMAN, D.V.M., M.S.

Rochester, Minnesota

TO BE invited to prepare and deliver the John W. Bell Tuberculosis Lecture is a high honor indeed. While I am grateful for that honor, I am also concerned with the responsibility assumed when I accepted your committee's invitation. The subject suggested for discussion was chemotherapy in experimental tuberculosis. In view of the attention given to the chemotherapeutic attack on such a wide variety of different diseases during the past five years, it is perhaps timely that this form of therapy be reëxamined in its relation to tuberculosis.

There has been no more fascinating nor epochal phase of modern medicine than the development and clinical application of new drugs that have conquered infections due to streptococci, meningococci, gonococci and pneumococci. This is only a partial list of the infectious agents that have been shorn of their disease-producing and perhaps life-taking propensities by the relatively new sulfonamide-containing drugs. New compounds are constantly being prepared and the possibilities for future development that may eclipse even the spectacular achievements already witnessed are limited only by the imagination of the research chemist.

Although the use of chemical agents in the treatment of infectious diseases has been practiced ever since the discovery of pathogenic bacteria, until relatively recently there have been only three chemotherapeutic agents that might be considered as specific in the treatment of disease. These were mercury for syphilis, quinine for malaria and ipecac for dysentery. Modern chemotherapy dates from 1909 when Ehrlich's brilliantly conceived and systematically pursued studies culminated in the discovery of arsphenamine. This is considered by many as the greatest triumph of modern chemotherapy up to the time that Domagk announced that prontosil when given orally had prevented the development of otherwise fatal hemolytic streptococcal infections in mice. Although Domagk's work apparently was done in 1932, it was not announced publicly until February, 1935.[4]

The present successful but limited chemotherapy which has revolutionized the treatment of many bacterial infections has stimulated an interest in this form of therapy that is comparable to that generated by the findings of Lister and those of Ehrlich. Theoretically it should be possible to provide for every bacterial and parasitic disease a suitable chemical substance that will destroy the infective agent without exerting serious toxic effects on the host. However, up to now there exist many practical considerations that impose definite limitations to the general application of chemotherapy. Nevertheless when one considers what has been accomplished during the relatively short period since the therapeutic value of prontosil was discovered, it is difficult to overstate the possibilities of the future.

In this presentation the time allotted makes it necessary that the subject matter be somewhat circumscribed. Successful chemotherapy in tuberculosis has been the objective of countless investigations since the time of Koch. To give a detailed account of all the attempts that have been made to find a chemical substance that would be effective against a tuberculous infection would perhaps be unwarranted, since several excellent

John W. Bell Tuberculosis Lecture, Minneapolis, Minnesota, February 2, 1942. From the Division of Experimental Medicine, The Mayo Foundation, Rochester, Minnesota.

reviews are available for those who are especially interested. Suffice it to say that although the agents tried have included such diverse substances as the heavy metals and the fatty acids of chaulmoogra and of cod liver oil, the long awaited and fervently hoped for chemical agent that can be depended on to combat successfully tuberculosis in human beings, remains to be demonstrated.

Writing in 1923, Calmette concluded his discussion of the chemotherapy of tuberculosis by the following statement: "It must be recognized that up to the present despite the great number of attempts made to discover among chemical agents a substance capable of arresting the development of experimental tuberculosis in the guinea pig and the rabbit, these efforts have been in vain." This conclusion was essentially that of Wells and Long[20] who wrote in 1932 that "No specific chemotherapeutic agent has been found for tuberculosis. No chemical yet used has cured the disease in the experimental animals employed." Corper[2] recently reviewed the question of chemotherapy of tuberculosis. He evaluated the data available up to the early part of 1940 and concluded that there was no specific chemotherapeutic agent of proved value in tuberculosis either in the sense of Ehrlich in which drugs in lethal doses are able to kill all the specific disease-producing organisms within the body at a single dose or in an etiotropic or parasitotropic sense. Kolmer and Tuft, writing in 1941, concluded that the only agents that have been at all effective in the chemotherapy of tuberculosis are the compounds of gold. These were considered, however, too toxic to warrant general use.

From the data that have accumulated concerning the attempts to obtain and demonstrate a chemotherapeutic agent that would combat tuberculous infections successfully, it is evident that the quest has been largely disappointing. Under the circumstances, announcement of results that indicate that a chemotherapeutic substance has been found that is capable in many instances of combating experimental tuberculosis successfully should be viewed with skepticism and the data subjected to a critical analysis. Until the facts in support of apparently favorable results are established firmly by repetition of the original experiment and are confirmed by independent workers, it is wise to maintain a conservative attitude concerning chemical substances said to have therapeutic value in tuberculosis. Investigators who are concerned primarily with facts and not fantasies will welcome criticisms and a challenging attitude by those motivated by a sincere interest in distinguishing the true from the false. It is in this spirit that Dr. Hinshaw and I have announced from time to time the results of our work with the chemotherapy of tuberculosis.[5, 6, 7, 8, 9, 13] We have been cautious about making specific claims, feeling that facts are easier to demonstrate than claims are to defend.

Before discussing the problem of treating tuberculosis by specific chemical substances, it might be profitable to provide a definition of chemotherapy. The term has been used rather loosely by some and apparently has meant different things to different authors. In a general sense treatment of a disease by a drug or chemical is chemotherapy. However, through the years there has been a tendency to limit the term chemotherapy to the specific treatment by drugs which act on the infective agent without seriously affecting the tissues of the host. Kolmer and Tuft defined chemotherapy as "the prevention and treatment of an infectious disease by specific chemical agents without marked or serious toxic effects" on the patient. This is an acceptable modern concept of the term and is more applicable to reality than the original concept of Ehrlich in which chemotherapy meant literally the disinfection of the infected body by a single dose of a specific chemical agent.

Practical Consideration of the Problem

There exist certain practical obstacles that confront the investigator desirous of initiating a comprehensive study of chemotherapy of experimental tuberculosis. There must be available proper physical equipment, adequate funds and intelligent and enthusiastic assistance if a satisfactory program is to be evolved. The project must be undertaken with the knowledge that it cannot be finished in a week, a month or even a year.

Up to the present time we do not know of any short cuts whereby the efficiency of a chemotherapeutic agent intended to combat a tuberculous infection can be determined definitely. It is true that tests in vitro can be and sometimes are used to determine the effects of a chemical substance on tubercle bacilli. While this method is not without merit and perhaps capable of a wider application, it is, we feel, inferior to the animal test in

which animals actually affected with tuberculosis are subjected to treatment. While the latter procedure is time-consuming and relatively expensive, it will provide information that can be obtained in no other way. It should be evident that conditions in vitro can never be other than artificial and that complicated organic compounds such as constitute most chemotherapeutic agents are likely to act and be acted on quite differently in an artificial medium than when in contact with the natural fluids and tissues of a living organism. In this connection it might be apropos to draw attention to the view that antibacterial substances such as the sulfonamides operate by depriving the bacteria of certain essential accessory food factors or metabolites which have been likened to vitamins and of which para-aminobenzoic acid is one example.

Additional knowledge of the synthesis necessary for bacterial growth may suggest eventually a procedure whereby the worth of a chemotherapeutic agent in tuberculous infection may be determined by tests in vitro rather than by procedures in vivo. The need for an accurate, simple test that can be completed within a few days at the most and in which the results can be interpreted in terms of the test in vivo is apparent to all who are concerned with the problem of chemotherapy as it pertains to tuberculosis.

In most other infections the value of chemotherapy has been determined relatively quickly by the use of the mouse. Biologically, however, this animal is unsuited for work involving human tubercle bacilli. The animal of choice continues to be the guinea pig. The marked susceptibility of guinea pigs to experimentally induced tuberculosis provides a circumstance of considerable importance in testing chemotherapeutic substances. If one is fortunate in establishing a proper balance between the dose and virulence of the bacilli and the susceptibility of the animals to be used it is possible to initiate a slowly and definitely progressive tuberculous disease that is not reversible. At least in our experience we have never encountered what we considered spontaneously resolved or cured tuberculosis in the guinea pig. If an animal of such marked susceptibility as the guinea pig becomes tuberculous as a consequence of experimental procedures and subsequently is apparently freed of the infection as a result of a definite therapeutic agent, the results should be significant.

Tuberculosis, whether naturally acquired or experimentally induced, differs greatly from most infections that have been found to be amenable to a chemotherapeutic attack. In tuberculosis the problem is not that of simple septicemia or an acute inflammatory process but is instead an elaborate pathologic complex consisting of bacteria of considerable tenacity, harbored within the protection of a morbid structure that is frequently extensive and of long standing.

It has been generally believed that successful chemotherapy is especially difficult in tuberculosis because of factors that are characteristic and inherent to the disease. These factors include the alleged impermeability of the morbid structure due to the avascularity of the tuberculous lesion and the high resistance of the protoplasm of the tubercle bacillus to penetration by chemical substances. These features, which have been discussed at some length by Wells and Long[19] and by others, do not provide, in my opinion, an adequate explanation for previous failures to demonstrate in tuberculosis the successful chemotherapy that has been and is being accomplished with certain other infective diseases. Under natural and experimental conditions we know that tuberculous lesions, in spite of their avascularity, are penetrated by substances such as calcium and, as Wells and Hedenburg[18] showed experimentally, by potassium iodide. By the use of intravital dyes it has also been demonstrated that tuberculous lesions are permeable.

The difficulty of the problem is not that of the permeability of the lesion but of providing a substance that, while not unduly toxic to the normal tissues, will be able to reach all parts of the morbid structures in a form that will kill the bacilli by selective bactericidal action, or will have a neutralizing effect on the products of the bacilli or will promote a stimulation of the reticulo-endothelial elements that are concerned with the cellular immunologic mechanism of defense. Should a chemical compound be developed which when given with therapeutic intent to a tuberculous animal achieves a desirable therapeutic effect, the exact mechanism by which the effect actually would be accomplished is likely to be obscure.[11]* The possibilities for complex biochemical reactions between the substance when it enters the body and the histiocytic and related elements of the tuberculous focus are infinite

*Possibilities as to the manner in which antibacterial substances function have been discussed by Fildes.[11]

and unpredictable. In considering chemotherapy one should keep in mind that the substance finally operative against the tubercle bacillus or against the morbid process generally is likely to be chemically quite dissimilar to the substance as it was introduced into the body.

Important Factors in the Critical Evaluation of a Chemotherapeutic Agent

From our limited experience in the field of chemotherapy we have become aware of the necessity of recognizing certain factors that we believe are important in the critical evaluation of a chemotherapeutic agent intended to combat experimentally induced tuberculosis. These factors are as follows:

1. The virulence of the bacteria used to establish the infection.—This, we believe, is one of the most important factors. Since the virulence of different strains of tubercle bacilli is subject to marked variation and since the virulence of the same strain is likewise unstable or at least unpredictable, an understanding of the factors that control or influence virulence of tubercle bacilli is essential. In most of our work we have preferred to use a strain of tubercle bacilli (H37RV)† whose history and biologic characteristics have been established by a prolonged period of observation and by an extensive investigation of its biophysical characteristics.[15] This strain, which we obtained originally from Dr. Arthur J. Vorwald of Saranac Lake, New York, has retained to date the virulence it possessed when it came into our possession in 1940. We have continued its cultivation by subculturing monthly on the synthetic medium of Proskauer and Beck.

A strain of tubercle bacilli of satisfactory virulence is one that when injected into guinea pigs in medium to small doses will produce typical progressive and uniformly fatal experimental tuberculosis. The appearance of inconsistencies in the results in the control animals should invalidate what otherwise might appear as significant results. Incidentally, accumulated experience indicates that in chemotherapy there exists no correlation between the virulence of the parasite and its resistance to chemical agents.

2. Relation of duration of infection to beginning of therapy.—Theoretically at least it should be less difficult to impede the progress of a tuberculous infection if the deterrent agent is present before or very soon after the animals are inoculated with tubercle bacilli than would be true if treatment is delayed until anatomic signs of the disease are definitely present. In other words we should be more concerned with the effect that a chemotherapeutic substance may have on a tuberculous infection already established than with the ability of the substance to exert a prophylactic action. From information obtained from our experimental studies Dr. Hinshaw and I more or less arbitrarily have considered six weeks as the minimal duration that an experimental tuberculous infection must have existed before therapy is started. If guinea pigs are inoculated subcutaneously with relatively small doses of human tubercle bacilli of standard virulence, there will be present in the majority at the end of six weeks small multiple focal lesions of tuberculosis. The lesions will be most common in the spleen and less frequent in the lungs and liver. The lesions at this time are usually actively progressive. Histiocytic and epithelioid cells predominate and necrosis is the exception rather than the rule. We have at this stage of the infection a definite and characteristic disease whose pathologic characteristics are those of a process that is advancing and may be expected to continue its destructive course with spontaneous resolution extremely unlikely.

Since the results of our work with "promin" have indicated that this drug is capable of exerting a favorable deterrent effect on tuberculous infections established in guinea pigs six weeks before treatment begins, we have adhered to this practice in all subsequent studies. It has been demonstrated repeatedly in our work that we possess in "promin" a drug capable of influencing favorably a tuberculous infection in guinea pigs that had existed six weeks before treatment was started. Therefore it seems reasonable to insist that in the future untried drugs be subjected to the same experimental condition. It appears that unless a chemotherapeutic substance can act effectively against an experimental tuberculous process that is morphologically recognizable when therapy is started the possibilities for the clinical use of such a drug are unimpressive.

3. Evidence that each animal to be treated was actually and unquestionably harboring a tu-

†A detailed account of the biologic characters of H37RV will be found in the report by Oatway and Steenken.[15]

berculous infection before treatment began.—This can be determined by: (1) the tuberculin test; and (2) histologic or other examination of tissue obtained at biopsy, six weeks after inoculation with tubercle bacilli.

4. Evidence of beneficial effects as a consequence of the therapeutic agent.—The treated animals as a group should live longer than those not treated, but of more importance than the survival time will be the influence, if any, that the drug has had in altering the expected dissemination of the disease, the amount and severity of the morbid process and the histologic character of the cellular elements constituting the tuberculous reaction.

5. Permanence of therapeutic effect.—It should be recognized that the therapeutic effect of a drug may be relative rather than absolute. The drug may act as a bacteriostatic agent preventing the multiplication of the bacteria but without the ability to kill the organisms. Again the compound may exert what Corper, Cohn and Bower[3] designated as "organic toxic" or "leukotoxic" effects in which there is a suppression by the drug of the parent cells which give rise to the monuclear histiocytic forms that constitute the cellular response to infection with tubercle bacilli. This would result, according to Corper, Cohn and Bower, in an apparent rather than a real retardation of the tuberculous infection. Although tubercles may not form, the tubercle bacilli remain viable and capable of subsequent mischief.

When the therapeutic agent is withheld until the disease has become sufficiently well established to enable tubercles to form, we have present a hyperplastic rather than an aplastic structure. If such lesions regress or eventually disappear during chemotherapy, it seems probable that the drug has had a direct effect on the infection.

To establish definitely that the favorable effect on an experimental tuberculous disease is permanent rather than temporary is not an easy task. The problem may be approached by: (1) culturing for tubercle bacilli or by inoculating into other guinea pigs, material prepared from the principal organs of predilection from animals that have been treated and are without recognizable tuberculous lesions at the time of necropsy; or (2) treatment of animals that have been receiving a given compound for a long period may be discontinued and the animals continued under observation indefinitely to determine if a residual infection that was latent when treatment was stopped will become manifest as a progressive and fatal disease. This latter procedure conceivably could give rise to false conclusions. Unless the animals are placed in a nontuberculous environment when chemotherapy is stopped, it may be difficult to determine with certainty that lesions of tuberculosis that may be observed months later at necropsy are not the result of an exogenous reinfection rather than the manifestation of an endogenous infection that successfully resisted the action of the therapeutic agent.

6. Recognition of the possibility that different strains of tubercle bacilli may reveal important variations in their resistance or susceptibility to chemotherapeutic agents.—Since chemotherapy in tuberculosis has been for the most part unsatisfactory and unpromising, precise information regarding the resistance or susceptibility to chemical substances of a representative number of different strains of tubercle bacilli is not available. Even though a compound is found that is effective in combating experimental tuberculosis induced by a specific strain of the tubercle bacillus, it would be injudicious to claim that the drug would be equally effective against all strains of the organism.

7. Confirmation of results by others.—If the results are to be accepted with confidence, it is important that the original observations be confirmed by independent workers. Many factors enter here to make this condition frequently difficult of achievement. If one undertakes to confirm another's work, it seems important that the original experiment be duplicated in all essential details. If the original procedure is not followed, the deviation should be stated. While acceptance of these basic principles in theory is practically universal, rare indeed is the instance in which a critical confirmatory experiment is carried out by duplicating every detail of the original work. If the results confirm the original observations, the procedure followed is perhaps of secondary importance, but if the results are contrary to those of the original study, it is not proper to claim that the original data could not be confirmed unless the original experiment was actually duplicated.

Original Observations

Our interest in chemotherapy of experimental tuberculosis had its beginning about the time the report of the work of Reid and Follis with sulfanilamide was published. Dr. Hinshaw had obtained for clinical investigation a quantity of sulfapyridine which he was using in the treatment of pneumonia. The fact that this drug appeared to have a wider antibacterial activity than was originally supposed suggested to us the desirability of testing it against an experimental tuberculous infection.

Incidentally, the importance of the work of Reid and Follis with sulfanilamide should, I believe, be emphasized. While they were properly conservative in their conclusions, the fact remains that their experiment showed that the development of tuberculosis in the guinea pig is definitely inhibited by sulfanilamide. Their data indicated clearly that an adequate dosage of the drug is an essential factor in the results obtained and that unsatisfactory or negative results will follow the use of an inadequate dosage. After the published announcement of Reid and Follis' work a number of reports were published by workers who attempted to confirm Reid and Follis' observations. While a few obtained results quite comparable to those of Reid and Follis, several did not and it is well to note that those who failed to confirm the original results failed to observe certain important factors that were clearly apparent in the report of Reid and Follis. These factors were adequate dosage and administration at intervals throughout the day to maintain an effective concentration in the blood and continuation of the treatment for the duration of the experiment.

Dr. Hinshaw and I believe that the work of Reid and Follis is of considerable importance because of the soundness of their experimental method and because their results indicated that tuberculosis even in the highly susceptible guinea pig could be inhibited in its expected course by a chemotherapeutic agent.* Their results provided reasons for believing that tuberculosis, one of the most drug-resistant of all infectious diseases, may yield eventually to a specific chemical substance. We still believe this is possible of achievement.

During the three or more years that we have been exploring the possibilities of chemotherapy as a means of combating experimental tuberculous infections, we have assembled sufficient data on nine different compounds to indicate which are of no value and which merit further investigation. The total number of compounds studied is not large and is only mentioned to emphasize the amount of time and energy necessary actually to test substances that theoretically may appear promising.

The different experiments which have been completed to date will now be described briefly.

Study 1.—Our first study was concerned with sulfapyridine. Two groups of guinea pigs, each consisting of twenty animals, were used. All the guinea pigs received subcutaneously over the sternum 0.0001 mg. of a recently isolated strain of tubercle bacilli, human type. For three days prior to inoculation with tubercle bacilli and for seven days after inoculation each of the animals in group 1 received twice daily by mouth 250 mg. of sulfapyridine.* After ten days the dose of sulfapyridine was reduced to 125 mg. given twice daily. Group 2 received tubercle bacilli only. After twenty-one days, when a guinea pig in one group died, an animal in the other group was killed for the purpose of comparison. The experiment was continued for fifty-six days after the injection of tubercle bacilli, when the animals that were living were killed for necropsy.

Twelve of the animals that received sulfapyridine lived three weeks or more. In the control group, four animals died during the last five weeks of the experiment; seven were killed during the same period for comparison with seven animals receiving sulfapyridine that died during this period. Nine were killed when the experiment was terminated. Subsequent studies revealed that tuberculosis had become definitely established in one or more situations in all the treated guinea pigs that lived longer than twenty-one days. Furthermore, the general situation indicated that these animals might have been expected to die eventually of the disease had the experiment been continued indefinitely. However, appreciable differences did exist in the character of the disease in the two groups of animals. These differences, it seems reasonable to pre-

*In a later report Follis and Reid presented evidence indicating that in tuberculous rabbits sulfanilamide in adequate dosage, properly administered, has a definite inhibitory effect on the development of the disease.

*The sulfapyridine was kindly supplied by Dr. D. F. Robertson, Associate Medical Director, Merck and Company, Rahway, New Jersey.

sume, were due to the effect of sulfapyridine. For reasons that appear to be inexplicable, the differences in the character of the lesions were most striking in the axillary lymph nodes contiguous to the site where the tubercle bacilli had been introduced and in the spleen. In those animals that did not receive sulfapyridine, the amount and character of the tuberculous changes in these tissues were severe and well marked, with caseation a prominent feature. By all criteria, there was present a progressive, destructive tuberculous infection that was unaccompanied by recognizable evidence of restraint.

These changes were in sharp contrast to the pathologic picture in the spleens and axillary lymph nodes of the animals that received sulfapyridine. With few exceptions there was present in such animals impressive and significant evidence that some inhibitory mechanism had been operative, with measurable success. The failure of the infection to be demonstrably present in the axillary lymph nodes of all but two of the treated animals seems important, as does the character of the disease in the spleens of all but one of the animals that received the drug. The failure of all the spleens but one to become hyperplastic is certainly contrary to what happened in the spleens of the animals that were not treated. Microscopically the lesions in most of the spleens from the treated animals were definitely those of tuberculosis that was unlike that in the controls. The tubercles were usually discrete epithelioid structures with necrosis absent or of minimal proportions. The tendency of the tubercles to remain for the most part within the confines of the splenic corpuscles is a significant feature that did not occur in the spleens from the untreated animals. Generally speaking, the inhibitory effects we observed were comparable to those produced with sulfanilamide as reported by Rich and Follis.

From the data obtained in this study we concluded as follows:

1. Sulfapyridine exerted a definite modification and retardation of the expected course and character of the disease in the animals receiving the drug.

2. The effects of the drug were most noticeable in the character and extent of the disease in the spleen and axillary lymph nodes.

3. Although certain desirable modifications in the character of the tuberculosis occurred in most of the guinea pigs that were treated, the results did not imply that sulfapyridine would be of value in the clinical treatment of tuberculosis.

Soon after we had completed our work with sulfapyridine, two additional compounds intended primarily for use in the treatment of a variety of nonmycobacterial diseases became available for investigational purposes. One of these was sulfathiazole and the other was designated by the manufacturer as "promin."

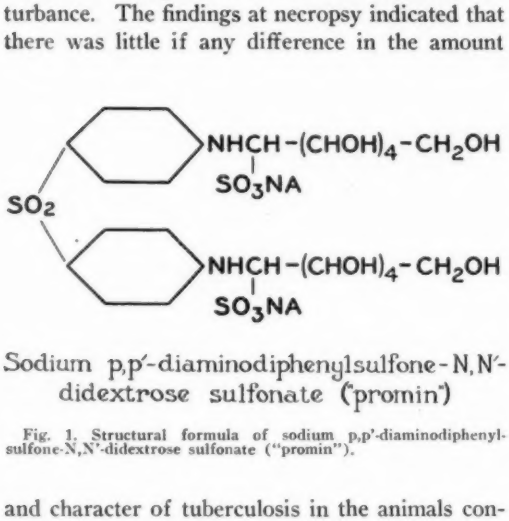
Our experience in administering to guinea pigs sulfapyridine orally twice daily for approximately eight weeks was sufficient to emphasize how laborious and time-consuming this procedure could be. Consequently, when the manner in which sulfathiazole and promin were to be given was considered, two other methods were tried. The instructions from the manufacturer were that promin should be given parenterally and this we tried to do. However, it soon became apparent that the parenteral administration of promin to guinea pigs was not satisfactory. We next tried giving the drugs mixed with the feed. This method proved convenient and satisfactory for both drugs. It not only presents a minimum of difficulties but has the important virtue of providing a more or less continuous intake of the drug during each twenty-four hours.*

Study 2.—The chemotherapeutic efficacy of sulfathiazole for experimental tuberculosis was determined by mixing 1 per cent by weight of the drug in the feed of thirty guinea pigs. Two days after administration of the drug was started, the thirty animals just mentioned and twenty controls were inoculated subcutaneously with 0.0005 mg. of the virulent variant of H37 designated by Oatway and Steenken as H37RV. All the untreated controls were dead eighty-two days after the experiment began. During this period twenty-one, or 70 per cent, of the treated animals also had died. Four additional animals in the treated group died during the next three days. The five remaining guinea pigs in the group that were receiving sulfathiazole continued to receive the drug daily until the experiment was terminated 164 days after inoculation.

This was not an entirely satisfactory experiment owing to the fact that many of the animals

*Incidentally it appears that promin is far more effective against an experimental tuberculous infection when given orally than when given parenterally.

in the treated as well as in the untreated group died as a consequence of a severe nutritional disturbance. The findings at necropsy indicated that there was little if any difference in the amount



Sodium p,p'-diaminodiphenylsulfone-N,N'-didextrose sulfonate ("promin")

Fig. 1. Structural formula of sodium p,p'-diaminodiphenylsulfone-N,N'-didextrose sulfonate ("promin").

and character of tuberculosis in the animals constituting the two groups. Although the nutritional disturbance was the immediate cause of death of many animals in both groups, it also happened that many other animals in both groups died as a consequence of their tuberculosis. The fact that five of the treated animals were living and continuing to receive the drug for eighty-two days after the controls had died perhaps suggests that the treatment had the effect of delaying in these animals what inevitably would have been death from tuberculosis. Each of the five animals was moderately to severely tuberculous after having received sulfathiazole for a total of 164 days. The results of this experiment indicated quite definitely that any effect this compound may have had on the course of the tuberculous infection was insignificant and that further trial of the drug in the chemotherapy of tuberculosis would be unwarranted.

Study 3.—Study 2 and study 3 were conducted concurrently. We were thus able to utilize the same group of controls for both experiments. This practice, which we have followed in subsequent work, not only effects an economy when more than one chemotherapeutic substance is to be tested; it also provides a common control factor that is important when comparative studies are being made.

Promin, which Dr. Hinshaw had been using with fairly satisfactory results in treating pneumonia, is known chemically as sodium p,p'-diaminodiphenylsulfone-N,N'-didextrose sulfonate. From the structural formula shown in Figure 1 the relationship of this drug to 4,4' diaminodiphenylsulfone is apparent. Although 4,4' diaminodiphenylsulfone is a highly effective chemotherapeutic agent, its marked toxicity has limited its clinical application. In promin the addition of the glucose radicals and of the sodium sulfonate groupings increases the solubility of the drug and presumably decreases its toxicity and perhaps its therapeutic efficacy.

Our first experiment to determine the effect of this compound on tuberculosis experimentally induced can be described briefly as follows: Fifty adult male guinea pigs were divided into two groups. One group consisted of thirty animals; these were to receive promin mixed with the feed to the amount of 1 per cent of weight.* The remaining twenty animals constituted the untreated or control group. After the thirty animals in the first group had been receiving the drug for two days, all the animals in this group and each of the twenty guinea pigs in the second group were inoculated subcutaneously with 0.0005 mg. of a recently prepared subculture of H37RV. The animals in the treated group continued to receive promin in their diet daily for eighty-two days or until all the animals in the control group had died.

As mentioned before, study 2 and study 3 were made concurrently. Consequently the same inadvertent nutritional disturbance that complicated the interpretation of the results with sulfathiazole was also operative in the animals that received promin. Yet in spite of what appeared to be premature deaths among the animals in the treated as well as in the control groups, the results indicated quite clearly that promin had had a deterrent effect on the expected course of the disease. When the last of the controls died eighty-two days after being inoculated with tubercle bacilli, 83 per cent of the animals that had received promin were living. At this time promin was removed from the diet of twelve of the twenty-four survivors while administration of the drug was continued in the diet of the remaining twelve. The experiment was terminated eighty-two days later at which time thirteen animals were living, eight of which had not received promin during the last eighty-two days of life.

*The promin we have utilized in our experimental studies was supplied through the courtesy of Dr. E. A. Sharp, Parke, Davis and Company, Detroit, Michigan.

Although lesions of progressive tuberculosis were present in the organs of predilection of all the animals of the control group, the degree of tuberculous involvement in the animals that received promin was notably less than in the control group. Fewer situations were affected and the lesions were fewer and smaller than was true in the guinea pigs that were untreated. Furthermore, in the spleen, liver and lungs of approximately 52 per cent of the treated animals cellular reactions that could be considered tuberculous were not found either grossly or microscopically.

During the course of this experiment an effort was made to determine whether or not spleens which appeared not to contain any lesions were actually free of virulent tubercle bacilli. Each of seventeen spleens of animals that had been treated with promin was divided and a portion emulsified for inoculation into two additional guinea pigs. Of the seventeen spleens, nine were found to contain viable tubercle bacilli and eight did not. Viable tubercle bacilli were demonstrated in all but one of the five spleens in which lesions of tuberculosis were present and positive results were obtained from five spleens in which lesions of the disease were not found. Lesions of tuberculosis were found in the spleen of only one of the five guinea pigs that had received promin for the entire period of observation—164 days—and three of the five spleens in which lesions were found were from animals that had received the drug for eighty-two days only. These observations make it evident that tubercle bacilli may persist in the apparently nontuberculous splenic tissues of animals that have received promin for as long as 164 days and be capable of inducing lesions of tuberculosis in untreated guinea pigs although the bacilli presumably were unable to do so in animals receiving promin. That many of the spleens were free of virulent tubercle bacilli, presumably as a consequence of the promin, was likewise established. It is also evident that tubercle bacilli may remain latent in tissues of guinea pigs long after treatment has been discontinued. This suggests the possibility that immunity developed in these animals, since subinoculation proved the virulence of the dormant organisms.

The information obtained in this experiment provided sufficient reasons for concluding that promin under the conditions imposed had a measurable chemotherapeutic effect on a tuberculous infection induced in a highly susceptible animal with a strain of human tubercle bacilli of known virulence. The longer survival time of the treated animals, the lesser amount of actual disease present and the nonprogressive nature of the lesions in the animals that received promin constitute reasonably convincing evidence in support of the foregoing conclusions.

Study 4.—The results obtained in study 3 indicated that in the treatment of experimental tuberculosis promin had therapeutic properties greatly in excess of any other compound with which we were familiar. That our observations with this substance should be extended was of course obvious. Consequently another experiment was undertaken. It had as its objectives the following: (1) to confirm if possible the observation that, when administration of promin is begun shortly before inoculation with tubercle bacilli, the drug will retard and in some instances prevent the development of tuberculosis; (2) to determine if promin might have a therapeutic effect on a tuberculous infection definitely established before treatment with promin was begun.

In study 4 the infective agent, the diet, and the dosage and administration of promin were the same as obtained in study 3. Eighty guinea pigs were used. Twelve did not receive promin and forty-eight of the remaining animals were divided into six groups of eight animals each. In these six groups administration of promin in relation to the time of infection was as follows: day of infection, three days after, one week after, two weeks after, four weeks after and six weeks after. In twenty animals the administration of promin was started, as in study 3, two days before the animals were injected with tubercle bacilli. At the expiration of six months all the untreated animals were dead, presumably as a result of the severe and widely disseminated tuberculous infection, while only eleven, or 16 per cent, of the treated animals had died during this period. Fifty-seven, or 84 per cent, of the treated animals survived. Among the sixty-eight animals that had received promin, demonstrable lesions of tuberculosis were absent in the liver, spleen and lungs of thirty-nine, or 57 per cent, while no lesions were found in the visceral organs of predilection, at the site of injection or in the contiguous lymph nodes in twenty-nine, or 43 per cent, of the treated animals. In view of the

longer survival time of the treated animals and the fact that the animals that received promin had less demonstrable tuberculous disease and that the disease was usually static or regressive, it was concluded that under the conditions of the experiments described in studies 3 and 4, promin had a deterrent effect on an experimental tuberculous infection.*

Study 5.—The tendency of promin to produce hemolytic anemia is one of the important factors that must be reckoned with in its clinical application. Although promin is fairly well tolerated by guinea pigs even after prolonged and continuous administration, it was recognized early in our work that this drug, like most other chemotherapeutic substances, is a poison and as such is potentially dangerous. The severity of the hematologic changes in guinea pigs produced by promin is generally speaking less than may be expected in adult human beings. Fortunately the changes in the blood induced by promin have not been irreversible in our experience. When administration of the drug is stopped, the hemopoietic response is soon adequate for normal physiologic demands.

To reduce or perhaps avoid the undesirable blood changes that are likely to occur, especially in human beings subjected to prolonged and more or less continuous therapy with promin, intermittent administration of the drug was suggested. To provide information regarding the relative efficacy of promin given intermittently to combat a tuberculous infection the following animal experiment was carried out. The animals consisted of fifty-one guinea pigs, all of which were inoculated subcutaneously with 0.0005 mg. of a recent subculture of the virulent variant of H37 (H37RV). At the end of forty-two days all the animals were found to be sensitized to tuberculin, injected intracutaneously. The fifty-one animals were divided at this time into two groups, one group consisting of twenty animals that were to receive treatment with promin intermittently and the other group of thirty-one animals that were to remain untreated for control purposes. The schedule of treatment for the animals in the first group provided that the drug should be given for seven days every alternate week. In other words, a week of treatment was to be followed by a week during which no drug was given. As in previous experiments, the drug was incorporated with the feed to the amount of 1 per cent by weight. The experiment continued until all the animals in the control group were dead. This occurred 224 days after the animals had been inoculated with tubercle bacilli. Five days later the surviving animals that had been receiving promin every alternate week were killed.

When the experiment was terminated 229 days after the animals had been inoculated with tubercle bacilli, the thirty-one guinea pigs in the untreated group were all dead while twelve, or 60 per cent, of the animals that had been treated were still living. Of the eight guinea pigs in the treated group that had died, two had received promin for one week only and they died as a consequence of severe and extensive tuberculosis. The longest any of the treated animals that died had received promin was fifty-five days. Those that survived and were killed after 229 days had received a total of ninety-four days of treatment. This represents approximately thirteen alternate weeks.

That the administration of promin had influenced the morbid expectancy of the animals in the treated group markedly was clearly apparent when a comparison was made of the amount of tuberculosis in the treated and in the untreated groups. This difference could be expressed numerically when the amount and character of tuberculosis found microscopically in each animal were determined.* The average numerical index of infection for the thirty-one animals in the control group was found to be 8.7 while the average for the twenty animals that received promin every alternate week was 3.8. In another experiment (study 6) in which the infected animals received promin daily starting with the forty-second day after inoculation with tubercle bacilli, the average numerical index of infection was 2.5. Thus it becomes evident that in combating experimental tuberculous infections in the guinea pig, promin given daily continuously has a greater efficacy than when given daily every alternate week. Whether or not the toxicity

*A detailed account of the procedures followed and of the results obtained in studies 3 and 4 will be found in the paper by Feldman, Hinshaw and Moses.[9]

*The scheme we follow for determining the numerical index of tuberculous infection in guinea pigs is based on the arbitrary acceptance of the figure 10 as representing the maximal severity of the disease possible for a given animal. Tuberculosis of the spleen, lungs and liver respectively is graded 1 to 3 depending on whether the character of the disease is minimal, moderate or severe. If lesions are present in the region of inoculation even though lymph nodes may or may not be involved, the index of infection for this region is considered as 1.

of the drug for guinea pigs was less by the intermittent than by the continuous method of treatment we are unable to say, since no studies directed toward this feature of the experiment were carried out.

In this experiment it might be well to recall (1) that forty-two days had elapsed after the animals to be treated had been inoculated with tubercle bacilli, (2) that two of the animals died of extensive tuberculosis after receiving treatment for only seven days (this is indicative of the virulence of the infection) and (3) that the drug was given, not continuously but intermittently, with seven-day intervals between courses of treatment. That promin was capable, under these conditions, of exerting a therapeutic effect seems worthy of special emphasis.

Study 6.—The evidence we had obtained from the previously described experiments indicated that (1) promin was capable of extending the survival time of the animals that were treated; (2) when treatment was started before or soon after the infection was introduced, the drug in many instances seemed to prevent the establishment of morbid changes characteristic of an experimental tuberculous infection, and (3) in instances in which the infective agent was introduced as long as six weeks before treatment was started, the anatomic character of the disease was altered markedly or recognizable signs of the disease were missing when the animals were examined at necropsy. The evidence that led to these conclusions was based largely on a comparison of the results obtained in the treated animals with the results obtained with the untreated controls. In order that more impressive morphologic evidence might be assembled which would provide reasonable proof as to whether or not a deterrent effect had been exerted on a tuberculous process that was demonstrably present before treatment began, the following experiment was done.

A total of fifty-one guinea pigs was inoculated subcutaneously with tubercle bacilli, strain H37-RV. At the forty-second day when all were found to be sensitized to tuberculin intradermally administered, the animals were divided into two groups. Group 1 consisted of thirty-one animals. These were not treated and were considered as controls.* Group 2 consisted of twenty animals and starting with the forty-second day each animal in this group received daily with its feed approximately 300 mg. of promin. One week later laparotomy was performed on all the animals in group 2 and on twelve animals in group 1.† This was for the purpose of obtaining for microscopic study specimens for biopsy of the livers of the respective animals. Five animals died as a consequence of laparotomy, one in the control group and four in the group that was being treated.

As a consequence of the observations at biopsy it was determined definitely that tuberculosis was present in the livers of both treated and untreated animals at the time treatment was begun. These findings were compared eventually with the findings obtained from a study of the tissues secured at necropsy. The experiment continued until the last of the animals in the control group had died. This occurred 224 days after infection. At that time only three, or 19 per cent, of the treated animals that had survived laparotomy were dead.

The results of this study quite definitely confirm our previous observations that promin is capable of exerting a definite therapeutic influence on previously established experimental tuberculosis. The procedure followed provided morphologic evidence that in most instances tuberculous lesions present when treatment began resolved or became atrophic or regressive under the influence of the therapeutic agent.

This study strengthens rather than weakens confidence in the ordinary control methods of animal experimentation. The data obtained are entirely consistent with those secured in other experiments in which biopsies were not done. However, the procedure followed in this study makes it possible to know with certainty that lesions of tuberculosis were actually present during at least the early phases of the treatment. How much time was required for lesions to resolve in those animals that were without recognizable lesions when the animals were killed after receiving treatment for 184 days is not known.

The difference in the mortality rate and in the amount and character of the tuberculous disease present in the two groups of animals indicates

*This experiment was conducted concurrently with study 5. Consequently the same group of controls sufficed for this and certain other experiments.

†The surgical procedures required in this experiment were performed by Dr. F. C. Mann.

that a factor was operative in the treated group that was not operative in the group that was not treated. One can conclude only that the deterrent factor was supplied by the drug that had been given with therapeutic intent.*

Failures with promin.—Up to the time of writing we have treated, by the continuous daily administration of promin, 118 tuberculous guinea pigs. This total includes animals whose treatment began before the animals were inoculated and those whose treatment was delayed for as long as six weeks after the animals had been infected.† Although definite lesions of tuberculosis were present at necropsy in a considerable percentage of these animals, in only two instances did the amount and character of the tuberculosis present indicate that the drug had been without any therapeutic effect.

In one of the animals the treatment appeared to have aggravated the severity of the disease. This animal died 133 days after being inoculated subcutaneously with 0.0005 mg. of H37RV and had received promin daily with the feed during the entire period. At necropsy the amount of disease present in this animal was most impressive. There were a massive involvement of the spleen and a striking tuberculous pneumonia. The presence in the mononuclear cells of the liver and spleen of large numbers of acid-fast bacillary forms was indicative of hematogenous tuberculosis. As a matter of fact, the most striking feature of the tissues from this animal was the amazing number of acid-fast bacillary forms present, especially in the lung.

The second instance in which promin failed to exert any appreciable deterrent effect was encountered in study 6. The animal had received the usual dose of H37RV subcutaneously and forty-two days later the daily administration of promin was started. The treatment continued without interruption until the animal died 223 days after infection. Promin had been given for a total of 181 days. At necropsy, there were tuberculous lesions in the subcutis at the site of injection, the axillary lymph nodes were involved, the lungs, spleen and liver were affected extensively and there was hydrothorax. The amount and severity of the tuberculosis in this guinea pig were equal to those observed in any of the control animals.

Why promin failed to influence the outcome of the disease favorably in these two instances is inexplicable.

Efficacy of promin against strains of tubercle bacilli other than H37RV.—Although we recognize the importance of knowing whether or not promin will be as effective against experimental infections established by other strains of mammalian tubercle bacilli as against H37RV, we have up to the time of writing but little information concerning this question. We have preferred to utilize most of our facilities with other phases of the problem. We have believed that it was first necessary to establish acceptable proof that chemotherapy could be and had been accomplished against an experimental tuberculous infection which without successful treatment would become inevitably a severe, extensive and fatal disease.

We have in progress at the present time an uncompleted experiment in which a relatively small number of guinea pigs was inoculated with a recently isolated "sputum" strain of tubercle bacilli. At the time of writing it is nearly seven months since the animals were inoculated and nine of the ten animals in the untreated or control group are dead. The amount of tuberculosis in the animals dead in the control group varied from moderate to severe but appeared sufficient in every instance to account for the death of the affected guinea pig. Of the nine animals in which daily treatment with promin was started forty-two days after infection, only two have died. Although on the basis of survival time it would appear that promin has been effective in opposing a tuberculous infection that has succeeded during the same period of time in killing all but one of the untreated animals, final conclusions must await the results of the examinations at necropsy of the survivors.

Final Considerations

In closing we should outline briefly what our studies actually have established and what the significance of certain of the findings may be.

1. The necropsy records and the histologic sections that have been prepared (and preserved) from every animal utilized in these experiments provide convincing morphologic evidence that the

*A more detailed description of this experiment will be found in the paper by Feldman, Mann and Hinshaw.[10]

†The group of twenty tuberculous guinea pigs (study 5) that were treated with promin daily every alternate week is excluded.

tubercle bacilli used to infect the guinea pigs which were subjected to chemotherapy were definitely and satisfactorily pathogenic. After inoculation even of relatively small doses, guinea pigs became sensitized to tuberculin and moderate to severe tuberculosis was present at the time of death in all the animals in the various untreated groups. The facts obtained from the animals in the control or untreated groups as well as from those groups that were treated with compounds that proved noneffective provide proof that the infecting bacteria we have used have been consistently and indisputably pathogenic.

2. Comparative studies have shown that of the various compounds tested promin is the most effective in combating an experimentally induced tuberculosis. That many of the compounds studied proved to be without recognizable therapeutic effect serves to emphasize the greater efficacy of promin.

3. It has been demonstrated repeatedly that, although the infection existed for six weeks before chemotherapy was started and although morbid changes characteristic of tuberculosis were actually present when therapy began, promin was capable of striking and unusual therapeutic effects. The vast majority of the treated animals lived longer than the controls. Many animals were apparently rid of all recognizable signs of the disease that had been seen in specimens for biopsy obtained when treatment began. When present after treatment, the amount and character of the disease were in most instances significantly unlike those present in the untreated controls. In the former the morbid changes were rather simple and usually were regressive or static rather than progressive and destructive such as characterized the lesions in the untreated controls.

4. From the facts that have accumulated regarding the ability of promin in most instances to cope successfully with an established, progressive and potentially fatal tuberculosis in the highly susceptible guinea pig, it would appear that the clinical trial of this drug is justified. Writing in 1932, Wells and Long mentioned the difficulty of combating tuberculosis successfully in the guinea pig and stated: "We may feel quite sure that a drug which cures the disease in the guinea pig, or even influences it favorably, would more certainly be beneficial in the much less susceptible human being."

The word "cure" should be used with reservations in regard to the chemotherapy of tuberculosis, since it is extremely difficult to establish with certainty that a "cure" has been accomplished. It is, however, less difficult to recognize whether or not the disease has been influenced favorably or its course arrested as a consequence of a therapeutic procedure. In our studies a considerable number of promin treated guinea pigs that were known definitely to have had lesions of tuberculosis when treatment began were without demonstrable signs of tuberculosis when examined months later at necropsy. Whether such animals have actually been cured of their tuberculosis in the sense that viable tubercle bacilli are no longer present is not certain. However, there can be no doubt that the disease had been influenced favorably, presumably as a consequence of the substance that was given with therapeutic intent.

When promin is tried in the treatment of clinical tuberculosis, the attempt should be made with the realization that the project will be difficult and the task long and arduous. It would be strange indeed if promin proved the most effective of the compounds likely to be studied for their chemotherapeutic effect in tuberculosis. Compounds that are less toxic and more efficacious are being sought constantly and the possibility of eventually securing a drug more satisfactory than promin is promising. An institution that would provide for the clinical trial of promin would be of course in a position to utilize other compounds as they become available. It should be emphasized, however, that no compound should be used in the chemotherapy of human tuberculosis until its safety and relative effectiveness have been established adequately by results obtained from animal experimentation.

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SOME ASPECTS OF BLOOD STORAGE

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THE widespread use of stored blood, serum and plasma in the treatment of anemia and shock necessitates frequent attempts at correlation of the results obtained with such therapy. Furthermore, the national emergency will tax our present transfusion facilities, and at the same time will extend the use of stored blood so that every clinician must be made aware of the principles, the hazards, and the advantages of the various procedures involved. The urgency of the problem seems to justify a discussion of the fundamentals even at the risk of boring by repetition.

Historically, serious consideration of the possibility of storing blood for transfusions began with the work of Rous and Turner[22] at the Rockefeller Institute, who developed the first preservative solution. Their blood-dextrose-citrate mixture was tried on a practical scale by Robertson[21] at the casualty clearing stations of the Third Army, B.E.F., during World War I. However, this work was forgotten until a group of Russian investigators[9] began to employ stored blood in civilian cases. Their results, together with those obtained in the Spanish Civil War, and the favorable reports of its use for the first time in the United States at the Cook County Hospital[7,8] have established the therapeutic status of stored blood for both military and civilian needs.

In the field of transfusions, the bacteriologist is concerned with the preservation of the blood, and with the serological aspects of compatibility. Eliminating gross transfusion reactions due to incompatible groups is not his only problem, but it is an important one. Reactions due to incompatibility of the main blood groups (O, A, B, AB) are inexcusable, since correct grouping and cross-matching should eliminate entirely this type of reaction. Despite the simplicity of the tests involved, however, such reactions do occur. We have had one such non-fatal accident in the past two years.

Despite the elimination of reactions due to group incompatibility, reactions due to other factors still occur. Most of these reactions are minor, but occasional fatal ones have been observed. The reactions which may be encountered are as follows:

A. Mild:
1. fever
2. fever and chills
3. chills alone
4. urticaria
5. rigor

B. Severe:
1. nausea
2. vomiting
3. hemoglobinuria
4. jaundice
5. oliguria
6. stupor
7. uremia

The reaction rate varies with the institution involved and with the interpretation of what constitutes a reaction. In general, however, it is customary to have a 5 to 10 per cent reaction rate of the minor varieties, and less than 1 per cent of

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the more severe forms. DeGowin,[3] who has contributed much to the knowledge of the subject by his research on the preservation and administration of stored whole blood, has managed to reduce his total reaction rate to 5.6 per cent. Other workers have been less fortunate.

What are the factors influencing the rate of reactions?

Pyrogens.—The work of Seibert[24] and others has demonstrated that numerous bacteria, mostly nonpathogenic, will grow in solutions, in rubber tubing, on glass containers, and in distilled water. These bacteria will give rise to substances (pyrogens) which are not inactivated by sterilization, and which cause chills and fever when injected intravenously. They are undoubtedly responsible for many reactions we obtain from intravenous solutions, and from transfused blood or its derivatives. DeGowin[5] found that rubber tubing which was allowed to drain for eighteen hours before sterilization was responsible for a high incidence of reaction in blood transfusions coincidental with a rise in the number of reactions following the administration of intravenous fluids. To prevent a similar situation, all apparatus must be rinsed in freshly prepared distilled water, and together with the solutions, sterilized immediately after preparation.

Hemolysis.—It is difficult to assess the rôle of hemolysis as a cause of transfusion reactions. It has been conclusively demonstrated by DeGowin[6] and others that the amount of hemoglobin in the supernatant plasma increases with the increase in the time of storage. Despite this fact, DeGowin,[3] Muether[14] and others have found no significant differences in the number of transfusion reactions caused by blood stored for varying periods of time up to thirty-eight days. If it *were* demonstrated (which it is not) that old blood gives a larger percentage of reactions than freshly drawn blood, it would not necessarily mean that the hemoglobin is at fault, since a number of other products are formed by the disintegrating cells, along with the hemoglobin. It is our opinion that moderate hemolysis, in itself, is unimportant as a cause of reactions. It is, however, of importance in the therapy of conditions requiring red cell replenishment. We must consider, therefore, such factors as cell fragility, hemolysis, and donor cell survival in the recipient. Muether[15] has thrown some light on the situation. He demonstrated that mechanical fragility of the cells increases rapidly up to five days after storage, and then stabilizes at a constant level for the next thirty days. Bull and Drew[1] found the red cell count to remain about the same for fifteen days, and then to decrease by from 1 to 1.5 million cells by the end of one month. Philip Levine[13] has contributed an interesting and pertinent observation on the survival of transfused red cells. Identifying the donor cells by means of the M and N factors, he found that cells stored three, ten or fourteen days survived in the recipient for eighty, sixty or twenty days, respectively, as compared with cells of fresh blood, which were still present in the recipient ninety-five days after transfusion. Thus the patient's syndrome must be considered in determining the importance of the length of storage of the blood to be administered.

To cut down on the rate of deterioration of the cells, various methods have been suggested. Of the greatest importance is the temperature at which the blood is stored since rate of deterioration increases with an increase in temperature. Most laboratories, including our own, keep blood at from 2 to 8° C. Blood kept at room temperature will deteriorate rapidly within twenty-four hours. Scudder[23] has introduced a special bottle which exposes a minimum of blood surface to the air, and has also advocated the use of an atmosphere of CO_2 to prevent deterioration due to oxygen exposure. A number of other workers have demonstrated that agitation increases the rate of disintegration.

Of importance, also, is the solution in which the blood is collected. DeGowin[6] demonstrated the superiority of a dextrose-citrate-blood mixture over a plain citrate mixture as a preservative solution. The difference in the hemolysis rate, however, only becomes significant after the blood has been stored for ten days. We have not used this preservative at the University Hospitals because all the blood administered is less than ten days old. The slight advantage of the dextrose solution in blood stored for less than ten days is counterbalanced by the increase in the volume stored (650 c.c. of 5.4 per cent dextrose, 100 c.c. of 3.2 per cent sodium citrate, and 500 c.c. blood are contained in the mixture, a total of 1,250 c.c.). In addition, the separate autoclaving of the citrate and the dextrose requires twice as

many flasks and doubles the amount of preliminary work in preparing the collecting apparatus. All this makes it advisable for us to use citrate alone as a preservative solution, and necessitates the use of the most recently drawn blood for those patients requiring red cell replenishment.

Chemical Changes.—Scudder[23] has attached great significance to the potassium which diffuses out of the erythrocytes during storage. He has shown that the potassium level in the supernatant increases progressively with time. Practically, however, DeGowin[4] has demonstrated that potassium is not important in transfusions of stored blood. I quote his clear conclusions based on actual test administration of bloods with high potassium levels:

> The high plasma potassium content in blood preserved for thirty days is not toxic when the blood mixture is transfused into human beings at velocities of less than 43.3 c.c. per minute. The concentrations of plasma potassium encountered in blood stored for one month are not high enough to cause significant increases in the serum potassium of the recipient.

Muether[16] confirms this opinion and cites as further evidence the use of stored blood in two cases of Addison's disease in crisis without a reaction resulting.

Rhoads and Panzer[20] and Quick[19] have found that prothrombin of stored blood diminishes on standing and they suggest that such blood is inferior to fresh blood in controlling bleeding in jaundice.

Scudder[23] has demonstrated a change on storage in the electrophoretic pattern of the blood proteins. Other workers have shown a decrease on standing of the leukocytes and complement. All these factors must first be shown to be necessary before we can even consider them as important in specific diseases. At present, they seem to be insignificant in the treatment of shock, and only of theoretical significance in other conditions.

Bacterial Contamination.—The reports of recent efforts to supply blood for the present emergency indicate that bacterial contamination is the single most important factor to be controlled in eliminating transfusion reactions. Only a completely closed system from donor to recipient will prevent contamination, and such a system is manifestly impractical even if possible. It then becomes necessary to minimize exposure of the blood to bacteria, which may come from the air or from contaminated surfaces. Secondly, it becomes essential to prevent the multiplication of bacteria which may enter the blood despite all precautions.

To minimize exposure, the blood bottle should be capped immediately after collection of the blood, and should not be opened unnecessarily. It is important that the blood be administered as soon as possible after it has been filtered through gauze in an open room. These things should be considered when blood is administered or drawn. The insertion of the hypodermic needle into the donor's vein offers an opportunity for the introduction of bacteria from the well contaminated skin. Thorough application of the bichloride-acetone-alcohol solution (Novak's solution) before insertion of the needle will help eliminate this step as a source of bacterial contamination.

The filtering process is not advisable from the point of view of sterility, but until further studies demonstrate a simpler and safer method for eliminating fibrin clots, this procedure will have to be tolerated. Citrate is not a perfect anti-coagulant, and clots will form.

Novak[17] first described the use of sulfanilamide in the preservation of stored blood. He found that the bacteriostatic properties of this drug in amounts "compatible with intravenous dosage" inhibited the growth of organisms normally found as contaminants in the blood. Before the routine use of this drug at the University Hospitals, contaminated bottles were not uncommon. Since its introduction (0.1 gram for every 500 c.c. of blood), there has not been a single contaminated sample in more than 5 million c.c. transfused in the past three years. Every blood reported to cause a reaction has been tested bacteriologically with consistently negative results. It must be emphasized that all the blood was less than ten days old, and during this period the bacteriostatic action of the drug is assisted by the leukocytes and natural bacteriocidal substances in the blood. In older bloods, the disintegration of these factors may make the sulfanilamide less effective.

Iso-antibodies.—The importance of isohemagglutinins in donor blood as a cause of reactions is a problem which still remains to be solved. There is a large amount of work indicating that blood from a universal donor is harmless when

given to a patient of any blood group. More recently, experience derived from the use of plasma and serum has added to the evidence indicating that the isohemagglutinins in administered blood, plasma, or serum are of negligible importance. Nevertheless we must consider isolated instances where the titer of anti-A and anti-B agglutinins has been extremely high, reaching 500 or more. Gesse[10] has published the most complete study on this phase of transfusion reactions. He described forty-six cases of shock following administration of universal blood; twenty of these were fatal. New York State has also recognized the possibilities involved and adopted a sanitary code regulation requiring group O blood to be titrated before use in order to eliminate bloods with a high titer of isohemagglutinins. To counteract the deleterious effects of universal blood, Witebsky and his co-workers[27] have introduced antigenically specific A and B substances which neutralize the homologous hemagglutinins when added to the whole O blood. We have used these substances on fifteen patients and have noticed no untoward reactions on the administration of the treated universal blood. Titration of the bloods before and after adding the specific substances revealed the anti-A and anti-B agglutinins in group O blood were almost completely removed. Further work is necessary to demonstrate conclusively the dangers attached to the use of group O blood, and the benefits to be derived from Witebsky's substances. The use of universal blood in infants and children is more to be questioned than its use in adults, since the dilution factor is not so great in young children.

In 1940, Landsteiner and Wiener[11] demonstrated a factor in human cells which corresponds to a similar substance in the erythrocytes of the Rhesus monkey. This factor (Rh) is undoubtedly responsible for fatal reactions in humans after repeated transfusion.[26] In this respect, it is like the M and N factors, but unlike these, it is not easily demonstrated in a cross-matching. In a later paper[12] Wiener has described a method for detecting the presence of the Rh factor by the use of guinea pig antiserum. Whether the same method can be used in a cross-matching remains to be seen. It may be necessary to test each blood for Rh factor before transfusion to prevent the administration of Rh positive blood to Rh negative patients, but at present the materials for such a routine test are not available. The guinea pig is not an entirely satisfactory animal, according to Wiener, and a better animal is needed before the antiserum may be used routinely.

The demonstration of the Rh factor suggests the possibility of other similar but as yet unknown substances being responsible for reactions in repeated transfusions. Further experimental work is obviously necessary.

Allergic Factors.—Frequently, following a transfusion, recipients have demonstrated symptoms indicating an allergic response to the transfusion. The most common sign is a generalized urticaria. DeGowin[3] could find no relationship between this reaction and a history of allergy in the patient; however, this does not disprove the allergic nature of the condition. Many have recognized the theoretical possibilities of the transfer of allergens in the transfused blood. This has been responsible for the requirement of many hospitals that fasting donors be used exclusively. Such transferred allergins would give an urticaria if associated only with a skin sensitivity, but no other allergic manifestations. Under such a condition, a history for allergy might well be negative.

At the University Hospitals we have not required fasting from donors. This would be impractical, since all the donors are friends or relatives of the patients, and have been difficult to obtain even without prerequisites. The imposition of fasting previous to drawing blood would cut our present supply considerably. However, if a new source of supply is obtained, such a procedure should be endorsed, although the time factor would be arbitrary at best. At the suggestion of Dr. C. J. Watson, we have recently inaugurated the practice of marking the fasting time on the label of the blood bottle. This has been done so that patients with allergic histories may receive bloods drawn as long as possible after a donor's meal.

Blood Bank at the University Hospitals

Blood is drawn by interns of the individual services and given to the blood bank. This blood is credited to the service. There is as much blood in the bank as is credited to all the services. Blood is released from the bank upon receipt of a written request for a cross-matching with the patient's serum. It is given out regardless of the

individual from whom it was drawn or the service to which it is credited.

The blood is kept at from 2 to 8°C., and is labeled as follows:

Group——— Date———
For ———
From——— Age———
Doctor ———
Space for Laboratory
Kline——— Date———
Fasting time———

Before administration, each blood is cross-matched with the patient's serum for agglutination and hemolysis. The agglutination test is run by using a drop of a suspension of the donor's cells plus a drop of the patient's serum. This is incubated on a slide for fifteen minutes at room temperature, and read as to whether agglutination or rouleaux has occurred. The hemolysis test consists of combining equal portions of patient's serum and donor cell suspension in a test tube at 37°C. for one hour. The test is then read as to hemolysis or non-hemolysis. We run both tests as a double check, and because some workers[2] have suggested the presence in incompatible bloods of isohemolysins independent of isohemagglutinins.

Bloods are not used if agglutination, rouleaux or hemolysis occurs. The detrimental effect of rouleauxed blood has never been demonstrated. Many bloods require numerous cross-matchings because of rouleaux formation, and as a result much extra work is involved.

A Kline diagnostic test for syphilis is run on each blood in the bank. The sensitivity of this test is thought to be sufficient for this purpose. We have numerous false positives, which are checked with the Wasserman and Kahn tests before being used. A 1+ Kline with a negative Wassermann and Kahn is considered safe for use. A sample showing a 2+ Kline confirmed by the State Board of Health is not used. There is every indication that the possibility of transfer of syphilis by stored citrated blood is almost negligible after twenty-four hours of storage, and impossible after storage for three days. Experimental work[25] has demonstrated that virulent spirochetes introduced into stored blood are eliminated in from forty-eight to seventy-two hours. Considering the number which might be present in circulating blood, and the fact that most of our blood stands for at least twenty-four hours, the possibility of a Kline negative blood causing syphilis in the recipient becomes remote, although not impossible.

Until recently we ran sterility tests on all bloods in the bank at the end of five and ten days' storage. Since these were consistently negative (over a two-year period), we eliminated the test except on occasional bloods. We have done this because the test for sterility itself introduces a source of contamination. Tests of all bloods causing reactions have failed to demonstrate a single contaminated specimen.

A few words about the apparatus are necessary for those who are interested in the practical aspects of the problem. Until recently we used the Abbott solution bottle. Priorities interfered with the production of the aluminum caps used for final storage of these flasks and we had to switch to a new container put out by the Upjohn Laboratories. The latter apparatus uses a square bottle which conserves storage space, and a plastic cap for final storage. It has the disadvantage of a complicated "well" for drawing the blood, which introduces another piece of apparatus to be cleaned. However, it is, in our opinion, the most satisfactory apparatus available at present.

During the past two months, we have attempted to collect data for a statistical study of the factors involved in transfusion reactions. It is too early to give a complete analysis of the data, but some of the results so far obtained are of interest. Of 377 consecutive bottles of blood transfused, the age of the blood is given in Table I.

TABLE I

Age of Blood in Days	Number of Bottles Given
1	94
2	57
3	63
4	46
5	36
6	29
7	26
8	16
9	7
10	3

Of the total, approximately 80 per cent were five days old or less. This would indicate, as we have stated previously, a rapid turnover of blood. The reaction rate of a consecutive series of 522 whole blood transfusions was 4.2 per cent. Of

the twenty-two bottles causing a reaction, eight gave repeated reactions in three patients. One patient developed chills and a rise in temperature after each of four bottles administered. Two patients developed these same symptoms after each of two bottles of transfused whole blood.

If we compare this with the reaction rate of 149 plasma transfusions (22,350 c.c.), we find that the plasma has an advantage, which, however, must be strengthened by a larger and statistically more reliable series before any definite comparison can be made between the whole blood and plasma. The reaction rate in the plasma series was 2.0 per cent, three of the 149 transfusions giving rise to reactions.

The types of reactions encountered are shown in Table II.

TABLE II. REACTIONS FROM WHOLE BLOOD

Type of Reaction	Number of Patients
Chill and fever	10
Chill	9
Spasms and chill	1
Edema	1
Itching	1

In addition to the above symptoms, three patients complained of nausea, one of back pain, one of a "prickly feeling" in the back, and four of headaches. Only two of the twenty-two reactions following the transfusion of whole blood involved heterologous groups. In these cases, group O blood was given to a group A patient. That this was not responsible for the reaction is indicated by the fact that both of these reactions were in the one patient who also reacted adversely to each of two homologous bloods.

Each time a reaction occurred, the blood was cross-matched again, and tested for sterility. In all cases, the results were negative. The fact that some individual patients react with many bloods at different times would indicate that the reaction is associated with some condition in the recipient. That this may be a developed immunity to some factor in the donor blood is suggested by the fact that many of the repeated reactors have had previous transfusions. In the one case with four reactions to four different bloods, the patient was suffering from aplastic anemia, and had been transfused many times before being studied in the present series.

It is beyond the scope of this report to give a comprehensive discussion on the use of plasma and serum as well as whole blood. Within the last year we have been supplying plasma on demand to all services. The plasma is drawn off whole blood which has stood in the refrigerator until the red cells have settled to the bottom. The plasma is syphoned off the cells and is used immediately after preparation.

All precautions for sterility are observed, but we realize that only a closed system would be entirely satisfactory. Since this is impractical and since filtering of plasma is a task requiring facilities not available to us, we have resorted to the use of freshly drawn plasma transferred in a closed room under a bactericidal ultra-violet lamp.

It is our opinion that this method of obtaining plasma is satisfactory for the present demands of the average hospital. If storage is required, a new problem arises. The simplest method of storing serum or plasma is by rapid freezing and storage at subzero temperatures. We have tried this method on plasma, with the aid of the Human Serum Laboratory, and have found it satisfactory providing the niceties of the freezing and thawing procedure are observed.

If the plasma is not frozen in a shell in CO_2 ice, it yields fibrin clots when thawed out. If it is so frozen, kept at subzero temperatures, and thawed out at 37° C., the final product is entirely satisfactory and gives rise to no reactions.

It must be remembered that frozen plasma will permit the growth of bacteria after the thawing process begins, so the plasma should be used almost immediately after thawing. There is a hazard of contamination in this type of preservation which must always be kept in mind. A more satisfactory way would be to filter the plasma before freezing. The most desirable procedure involves the filtering, freezing, and drying of plasma and serum, which method will eventually replace all others when facilities are available.

The serum versus plasma controversy is one which has more of a partisan than a scientific basis. There is no reason to believe serum to be more toxic than plasma as is claimed by the proponents of the use of the latter. Nor is the evidence of the serum group any more reliable when directed against the use of plasma. It would seem from an examination of the figures on both serum and plasma transfusions that both are better than whole blood in that they cause

fewer reactions. There is, however, no statistically sound information available as to which form (dry or wet, frozen or unfrozen) of serum or plasma is preferable.

No doubt much has been omitted in the above discussion, but it is a fault inherent in so comprehensive a field. We have tried to point out that a fundamental scientific approach to the subject of blood storage and transfusion is essential if we are to get rid of the many superstitions associated with it.

Many other questions arise, and many problems remain to be solved. It is a step forward to recognize their existence.

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GASTROJEJUNOCOLIC FISTULA
Report of a Case

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GASTROJEJUNOCOLIC fistula presents a formidable surgical problem. Czerny was the first in 1903 to report a case of gastrojejunocolic fistula. Recent reports[1] indicate that there have been 322 such cases recorded in the literature. Undoubtedly, there are many more which have not been reported. Because of the various procedures which have been used to correct this very unfavorable condition, it is believed worth while to report a case successfully treated by a two-stage method.

Gastrojejunocolic fistula is one of the most dreaded of all complications resulting from gastro-enterostomy. It has been stated that because of the popularity of gastro-enterostomy during the past fifty years, that this condition has become increasingly more common. This communication is a result of ulceration between the stomach, jejunum and colon and is usually secondary to gastro-enterostomy, but it is also known to be associated with malignancy.[4]

The statistics show the presence of anastomotic ulcers to vary considerably. Some men are of the opinion that marginal ulcers occur in from 1 to 3 per cent of cases.[8] However, others have reported the frequency of marginal ulcers as high as 35 per cent. The occurrence of gastrojejunocolic fistulas is overwhelmingly more common in the male than in the female. This is due to the preponderance of peptic ulcers in the male. This complication is found to occur most frequently in the third to fifth decades of life and is found in

From the Interstate Clinic, Red Wing, Minnesota. Read before the annual meeting of the Southern Minnesota Medical Association, Mankato, Minnesota, September 29, 1941.

patients who are in the so-called peptic ulcer diathesis group.[3] The appearance of such fistulas are reported[2] to have occurred from six weeks to twenty-one years following a gastro-enterostomy.[7]

Symptoms

The most pronounced symptoms of gastrojejunocolic fistulas are: (1) indefinite abdominal pain which may be similar to that of a peptic ulcer or at times may be entirely absent; (2) persistent diarrhea resistant to medication and a watery, alcoholic stool which contains varying amounts of undigested food; (3) rapid and progressive weight loss, despite a good appetite; (4) eructation characterized by a foul odor; and (5) at times the vomiting of fecal material.

Diagnosis

The diagnosis is often easily made, but at times may be very difficult and tests the diagnostic acuity of the surgeon. The use of the barium meal and barium enema are of definite value in establishing the diagnosis of a communication between the upper and lower reaches of the gastrointestinal tract. Once the diagnosis is made, prompt surgical treatment is indicated.

Treatment

The treatment of gastrojejunocolic fistulas consists of prophylactic treatment. This should be directed towards a strict medical management of all patients who have had operations for a peptic ulcer.

To operate on a patient with a gastrojejunocolic fistula without rehabilitation invites disaster. Each case makes its own demand on the judgment of the surgeon. These patients are usually suffering from emaciation, dehydration, chemical imbalance, and a lack of vitamins. Because of the extreme debility of such patients, various surgical procedures have been reported, the mortality ranging from 25 to 63 per cent. However, with a careful pre-operative regime the mortality can be considerably reduced.

Pfeiffer[5, 6] has recently advocated the use of a colostomy prior to the restoration of the gastrointestinal tract. He stated that the cause of the rapid diarrhea and chemical imbalance in these cases is the regurgitation of colonic material into the stomach, and this causes rapid peristalsis through the small intestine with little or no absorption of the food. He believes that to sidetrack the fecal stream and thereby not allowing the feces to pass through the portion of the colon involved in the fistula, has a three-fold purpose: (1) prevent feces from regurgitating into the stomach; (2) allows edema and the adjacent inflammation in the tissues to subside; (3) protects the suture line in the repaired colon.

In a recent survey, Pfeiffer has found that in fifteen cases, the mortality has been but 6 per cent when a preliminary colostomy was done. The procedure is justifiable and, as stated above, should be carried out as a first stage to rehabilitate these patients in order that they will be better able to stand the more formidable surgical procedure of restoration of the gastro-intestinal tract or a partial gastric resection, if necessary. Bloc resection of the parts involved in the fistula has often been necessary in treating gastrojejunocolic fistulas.

The case which I am to report has utilized the principle advocated by Pfeiffer, but instead of the use of a colostomy, an ileostomy was done because it was thought that an ileostomy is a less formidable procedure than a colostomy and that it precludes the necessity of crushing the spur as is done in Pfeiffer's method. Also, there is not an undue amount of fluid lost through an ileostomy.

Case Report

J. F., male, aged fifty-four, stated that he had had a gastroenterostomy five years ago and had remained well until two months previously, when he developed a diarrhea, consisting of ten or twelve bowel movements a day. The patient stated that he had been belching up foul smelling gas from his stomach for the past six weeks and that he had lost twenty-five pounds over this period. The laboratory work was as follows: The urine was essentially normal, hemoglobin 90 per cent; red blood count 4,630,000, white blood count 11,700. Differential count of neutrophils 37, lymphocytes 61, large mononuclears 1 and eosinophils 1 per cent. The blood Wassermann was negative. Gastric analysis showed the acidity to be within the upper limits of normal. The feces were found to be negative for occult blood.

A sigmoidoscopic examination was made for a distance of 24 cm. which disclosed a rather injected mucosa with a large amount of undigested food material present. A barium enema was given which showed the barium to immediately enter the stomach as well as the small intestine (Fig. 1). Also, barium by mouth was found to enter almost immediately the colon as well as to go rapidly through the small intestine. A diagnosis of gastrojejunocolic fistula was made.

On January 2, 1941, a knuckle ileostomy was done through a McBurney incision (Fig. 2), a glass rod being used to anchor the loop of ileum. No sutures were taken and the wound was packed with vaseline gauze. The ileostomy was opened on the second day and the patient immediately responded to the treatment. The diarrhea ceased and he had but one bowel movement by way of the rectum during the ensuing month. The patient no longer had eructations of foul material and his appetite increased. The patient was given perenteral vitamins in large doses and placed on a high-caloric diet. He was discharged on January 15, 1941. When he was next admitted on February 27, 1941, he had gained forty-three pounds. The gastrojejunocolic fistula was then repaired, the fistula measuring about 2 cm. in length and 1 cm. in diameter. The indurated tissue was removed and the defect in the colon was closed transversely with chromic catgut and supplemented with interrupted silk mattress sutures. The posterior gastro-enterostomy was taken down (Fig. 3). The jejunum was closed with three layers, two layers of catgut, and a third layer of interrupted silk mattress sutures. The posterior wall of the stomach was likewise closed by a similar method. The lumen of the jejunum was somewhat compromised by this type of a suture and it was thought that the lumen of the jejunum would be inadequate to carry food to the lower reaches of the intestine. For this reason, a side to side anastomosis in the jejunum—ajejuno-jejuno anastomosis—was then made, by-passing the stenosed portion of the jejunum. Sulfanilamide crystals were placed on the suture lines.

The patient was given a blood transfusion as well as perenteral vitamins. His chemical balance was re-

Fig. 1. Barium enema entering stomach and small intestines.

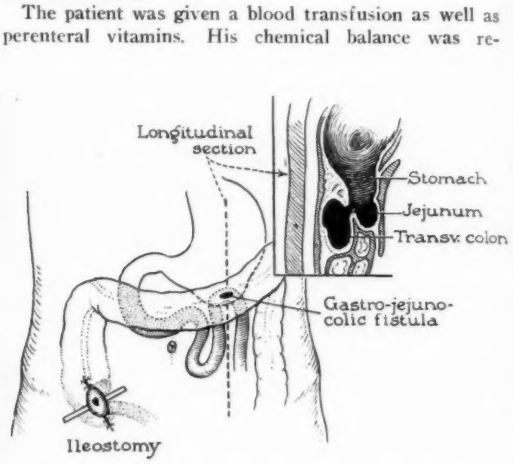

Fig. 2. Illustration showing site of pathologic lesion and ileostomy.

established by means of saline and the patient was discharged on March 26.

The patient continued to improve. There had been no undue fluid loss during the existence of the ileostomy. He became adjusted to wearing a colostomy bag and it was with some insistence that the patient allowed the ileostomy to be closed. He stated that he was perfectly comfortable and because of the inadequacy of plumbing in rural Minnesota in the winter time, he saw no particular reason to have the fecal stream pass in the normal way.

On July 3, 1941, the ileostomy was closed by suturing the defect transversely with chromic catgut sutures and reinforcing with interrupted silk mattress sutures. Sulfanilamide was placed over the suture line and the abdomen closed in layers. The patient was discharged on July 13, 1941.

The follow-up on this patient showed no activation of his former duodenal ulcer and the barium passed normally through the stomach and the remainder of the gastro-intestinal tract. A recent check-up found this patient to be enjoying good health.

Discussion

The use of an ileostomy to divert the fecal stream was followed by marked improvement in the patient as well as subsidance of the diarrhea. The use of an ileostomy rather than a colostomy proved beneficial and is thought to be an easier surgical procedure, and can be done with practically no mortality. The use of stage operations such as this allows, as Pfeiffer has stated, for improvement of the patient, allows the inflammatory reaction in the region of the fistula to subside, and also serves as a safeguard against blow-

ing out the suture line in the colon. As has been stated in numerous articles, patients suffering from this condition, the so-called ulcer diathesis, should in certain cases have a partial gastric resection so as to preclude the possibility of any

3. The merits of stage operations utilizing Pfeiffer's principle of diverting the fecal stream so as to allow the patient to be rehabilitated before restoration of the gastro-intestinal tract is attempted, has been described.

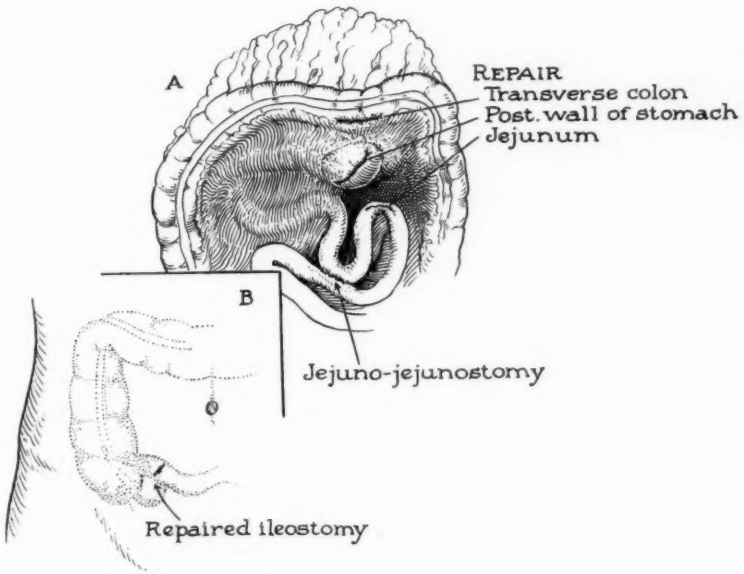

Fig. 3. Illustration showing repair of transverse colon and restoration of continuity of gastro-intestinal tract, also site of jejunostomy. Insert: Site of ileostomy.

further ulcer formation. However, it is felt in this case that because of the age of the patient that his acid will gradually decrease, thus lessening the chances of recurrence of his original duodenal ulcer. It is not thought that a procedure such as a gastric resection is warranted at this time.

Summary

1. A case of gastrojejunocolic fistula is reported.

2. Ileostomy is efficacious in diverting the fecal stream.

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In planning the battle strategy against tuberculosis we need to keep in mind important traits or characteristics of the enemy. We have had a recent taste of dealing with an enemy of slimy cunning, hiding under a cloak of diplomatic conversations. Tuberculosis is another such foe; sneaking, insidious and stealthy. No policy of appeasement or of diplomatic negotiation will accomplish results. Either this must be an "all-out" war or it will be one of the comic opera variety. Another characteristic of this foe is the habit of striking hardest where resistance is least. To conquer such a foe we must be fully prepared, well armed. We must attack on a wide front and not merely by launching two-man submarines.—MATHEW WOLL, *Pennsylvania's Health*, Feb., 1942.

MITRAL STENOSIS AND PARALYSIS OF THE LEFT RECURRENT LARYNGEAL NERVE

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CONVINCING proof is yet wanting that paralysis of the left recurrent laryngeal nerve may be caused by mitral stenosis. Mitral stenosis is a common clinical condition. However, in only a rare case of mitral stenosis is any evidence exhibited of an associated laryngeal paralysis.[1] If there is a cause and effect relationship between these two conditions, it is difficult to understand why paralysis of the left recurrent laryngeal nerve is seen so seldom in a condition as common as rheumatic mitral heart disease. Kelly[2] suggested that perhaps the association of left laryngeal paralysis with mitral stenosis was merely a coincidental occurrence. It is a well known fact that in many cases of laryngeal palsy there is no clue whatever as to the etiology.[3] New and Childrey[4] presented 194 cases of paralysis of the left recurrent laryngeal nerve; in sixty-seven of these, or 63.8 per cent, the condition was of unknown cause. Had mitral stenosis been present in any of these sixty-seven cases, it would have been logical to assume that laryngeal palsy was the result of the associated mitral stenosis.

To add to the uncertainty, several different mechanisms have been postulated to explain how mitral stenosis may cause paralysis of the left recurrent laryngeal nerve. Ortner[5] in 1897 first described the occurrence of left laryngeal paralysis in association with mitral stenosis. The cause of the laryngeal palsy, he said, was pressure on the recurrent nerve by the dilated left auricle which compressed the nerve between the auricle and the arch of the aorta. Herrick[6] and later Grabower[7] subscribed to this view, but Fetterolf and Norris[8] in 1911 showed rather conclusively that pressure of the left auricle against the arch of the aorta was anatomically impossible. They found that in mitral stenosis the dilated left auricle pushed the pulmonary veins upward; these veins, in turn, exerted pressure on the superiorly located pulmonary arteries. The already dilated pulmonary arteries compressed the recurrent nerve between themselves and the aorta and the aortic ligament. King, Hitzig and Fishberg[1] reported three cases of hypertensive and arteriosclerotic heart disease in which an associated left laryngeal paralysis was present; laryngeal palsy developed in two of the cases after coronary occlusion. They explained the paralysis as being caused by dynamic compression of the recurrent laryngeal nerve between the pulmonary arteries and the arch of the aorta. The reason laryngeal palsy was found so rarely in cases of mitral stenosis, they suggested, was that the anatomic conditions necessary for compression of the recurrent laryngeal nerve by the pulmonary arteries are fulfilled in only a small proportion of persons.

Hall, Ferrier and Permewan[9] and Kraus[10] believed that the left recurrent laryngeal nerve becomes paralyzed as a result of traction exerted on it by the aortic arch, which is dragged upon by the enlarged heart. Adam[11] and later Langeron[12] stated that laryngeal nerve palsy did not occur in heart disease unless there was some associated inflammatory condition in the mediastinum or in the pericardium.

Thus, five different mechanisms have been described to show how the dilated heart in mitral stenosis may cause paralysis of the left recurrent laryngeal nerve and none actually has been proved.

This report is based on ten cases in which paralysis of the left recurrent laryngeal nerve was associated with mitral heart disease. The records of 223 patients who had left laryngeal palsy were examined in the course of this study. In all cases, the diagnosis of paralysis of the left recurrent laryngeal nerve had been made by a qualified laryngoscopist. There were ninety-one cases, or 41 per cent, in which no cause for the laryngeal paralysis could be found. Had a mitral cardiac lesion been discovered in any of these cases of unknown etiology, the laryngeal palsy probably would have been considered to be a result of mitral stenosis. Actually, two patients who did have mitral stenosis were included in this group. They represented well-compensated subclinical conditions in which very little cardiac enlargement was present, and we considered the

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mitral stenosis to be merely coincidental. The condition of these two patients previously had been diagnosed as laryngeal palsy secondary to mitral heart disease.

Paralysis of the recurrent left laryngeal nerve among the ten patients mentioned herein was considered to be the result of mitral heart disease. The average age of the patients was thirty-eight years. There were six females and four males. Two patients had auricular fibrillation. All ten patients were suffering from well-advanced mitral stenosis and were found to have markedly enlarged hearts by clinical and roentgenologic examination. More significant, however, was the fact that in all but two cases recurrent laryngeal palsy had occurred during a period of cardiac decompensation. The other two patients had a marked reduction in cardiac reserve, but had not as yet experienced actual congestive failure.

Assuming that left laryngeal palsy has only a fortuitous relationship to the presence of mitral stenosis, we should expect mitral stenosis to be found no more frequently among patients suffering from left laryngeal palsy than among patients taken at random. We found, actually, among the 223 records of left laryngeal palsy that were reviewed, ten cases of mitral stenosis, or an incidence of about 5 per cent. A study of the general records in the clinic revealed that mitral stenosis is present in the clinic population as a whole in only about a half of 1 per cent of cases, so that we found mitral stenosis to be relatively ten times more frequent among patients who had paralysis of the left laryngeal nerve than it was in the general control group. Similarly, it could be argued that if the relationship of left laryngeal palsy and mitral stenosis were merely circumstantial, then mitral stenosis would be found at least half as frequently among cases of *right* laryngeal palsy as among cases of *left* laryngeal palsy. (Paralysis of the right recurrent laryngeal nerve occurs about half as frequently as paralysis of the left recurrent laryngeal nerve).[4] On the other hand, if the rationale on the basis of which this inquiry is being made has validity, namely, that in the presence of mitral stenosis and the resultant enlargement of the right portion of the heart, pressure is exerted on the left recurrent laryngeal nerve which results in laryngeal paralysis on that side, then mitral stenosis should occur more than twice as frequently in instances of left laryngeal palsy as in cases of right laryngeal paralysis. As a matter of fact, whereas we found that nearly 5 per cent of the patients suffering from paralysis of the left recurrent laryngeal nerve had coexisting advanced mitral cardiac disease, no instances of clinical mitral stenosis were found in any of the cases of right laryngeal palsy which were reviewed.

Summary and Conclusions

Well-advanced rheumatic mitral cardiac disease was found in ten of 223 cases of paralysis of the left recurrent laryngeal nerve, whereas no instances of advanced mitral cardiac disease were encountered among patients who had right laryngeal palsy. Mitral stenosis was found to be relatively ten times as frequent among patients who had paralysis of the left recurrent laryngeal nerve as it was in a general control group. These observations suggest that there is a causal relationship between the enlarged heart present in mitral stenosis and paralysis of the left recurrent laryngeal nerve.

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CLINICAL-PATHOLOGICAL CONFERENCE

MINNEAPOLIS GENERAL HOSPITAL

Frank C. Andrus, Pathologist

Presentation of a Case

DR. FRANKLIN MOOSNICK: The case is that of a chemist, forty-nine years old, who was admitted to the Minneapolis General Hospital on July 29, 1941. His present complaints go back to the beginning of 1941 when, for the first time in his life, he began to develop signs and symptoms of right and left heart failure. At that time, he was taken to one of the private hospitals and kept there for three weeks. He was treated by his physician with digitalis and became compensated during that period of time and was able to go home. He insisted that he had followed his cardiac régime religiously at home, but two months later he began to develop signs of mild heart failure. His most distressing complaint was severe nosebleeds which he could not control at home. He stated that his blood pressure was 240 systolic. A month or so later he became decompensated and was again hospitalized in June, 1941. He went home and some two or three weeks before admission, early in July, 1941, he again became decompensated and had the additional symptom of spitting up blood-tinged sputum. His past history was not remarkable. He had had rheumatic fever at the age of twelve years. He had had no episodes of rheumatic fever since then although he had had frequent sore throats which were followed by quinsy. He had some difficulty with his eyes which took the form of blurring of vision, spots before his eyes, headaches, and dizziness. These symptoms dated back to a year or eighteen months before admission to the hospital. His only other complaints were frequency and nocturia with day and night urinations being about five times each.

Physical examination revealed a mildly dyspneic and slightly cyanotic man. The pertinent physical findings included the signs of left heart failure with râles in the bases and a slight amount of free fluid in both bases. The cardiac dulness measured 12 cm. to percussion on the left. The rhythm was grossly irregular. The blood pressure was 170/118. The liver was enlarged. There was two plus edema of the ankles. The scrotum, at that time, was markedly thickened and swollen, the thickening being more than just edema. It was covered with flat, purple lesions which later on skin consultation were found to be angiokeratomata.

Laboratory Findings: There was slight leukocytosis, 13,900, with a normal distribution of the leukocytes. The hemoglobin was 72 per cent and the erythrocyte count was 5,200,000. The blood urea nitrogen was 23 mg. per cent. The urine revealed a maximum concentration of 1.019; it contained three plus albumin, occasional casts, a few white cells, and to as high as 20 red cells in all specimens. Serologic tests for syphilis were negative.

He was placed on the usual cardiac régime with limited fluids, diuretics, et cetera. He responded with a good diuresis. In the course of the first week or ten days, he lost twenty-five pounds in weight. Three or four days after admission, his temperature rose to 103 degrees and he developed a leukocytosis of 18,000. The chest was clear on physical and x-ray examination. No focus of infection could be found. It was during the exceedingly hot part of summer then and it was the opinion of the staff that he was suffering from heat retention secondary to marked diuresis and limited fluids. The fluids were increased slightly and his temperature fell. During the course of his management, he showed signs of digitalis intoxication and developed an acute heart block with A-V disassociation. Extra-systoles were heard. He became cyanotic and the heart rhythm was irregular, however, he did well on a cardiac régime. The heart rate later became regular and slow. He was transferred to a rest home for prolonged rest and convalescence.

He was again seen on the Medical Service on November 18, 1941. Physical examination at that

time was essentially negative. He was well compensated but the hypertension persisted. He now had hematuria in addition to the previous findings of albumin and low specific gravity. He was seen in consultation with the Genito-Urinary Service at this time and they felt that his difficulties were due to prostatic obstruction. Following their usual genito-urinary work-up, including pyelography and cystoscopy, a transurethral resection was done. He had a fairly stormy course following this. He bled rather profusely and many clots formed in the bladder. Cystoscopy was done and the clots were removed. They had to resort to suprapubic cystotomy to get the remainder of the clots.

In February, 1942, the suprapubic wound closed and he could urinate well. He was again transferred to the rest home for further convalescence. He apparently got along quite well for about a month. Early in March, 1942, he became decompensated again. There was a three plus edema of the legs. The liver was enlarged. The patient was slightly dyspneic. His blood pressure was 248/136. He was placed on limited fluids in addition to his digitalis and given diuretics. He improved somewhat. The edema went down and he was apparently coming along well. On March 12, 1942, at 4:00 p.m., previously having had a good day, he suddenly became quite cyanotic and dyspneic. He lost consciousness and his pulse became weak and thready. The respirations were fast and labored and then slow and labored. He sank into a coma and failed to respond. He expired about one hour and fifteen minutes after the onset of the attack.

DR. F. ANDRUS: Here we have a man of forty-nine years who had a history of hypertension and rheumatic fever and who had been hospitalized for a period of nine months with severe heart failure which responded to bed rest, digitalis, and to the usual treatment for heart disease with congestive heart failure. Then we notice that when he was compensated, we have a sudden death. Now what things may we think of as the cause of sudden death in this type of case?

DR. A. PEPPARD: I do not want to tell you the cause of his sudden death, but I do want to state that I would object most strenuously to an attempt to make a diagnosis from the information at hand. Even if the autopsy should show that it was due to coronary insufficiency or thrombosis, I would still object. There is too much tendency for people to ascribe sudden, unexplained deaths to coronary disease.

DR. ANDRUS: I think that is a good point. If we have a sudden death in a patient having hypertension, too many people assume that the death was due to coronary artery disease without proper and adequate study to support such an assumption. One must remember that in chronic heart failure, pulmonary embolism is very common and is often the cause of sudden death.

Autopsy Findings

DR. RALPH PAPERMASTER: The body was that of a well developed and well nourished white male. There was one plus edema of the legs. Upon opening the abdomen, the peritoneal cavity was found to contain about 100 c.c. of fluid. The pericardial sac contained about 200 c.c. of clotted blood. The tissue at the base of the heart was markedly hemorrhagic. The transverse thoracic diameter was 30 cm. and the transverse cardiac diameter was 20 cm. The heart weighed 980 grams, including the arch of the aorta. All of the chambers of the heart were markedly dilated. The left ventricular wall measured 22 mm. in thickness. The edges of the mitral valve were thickened and retracted. The hemorrhagic tissue at the base of the heart extended 12 cm. up over the arch of the aorta to the origin of the left subclavian artery. The hemorrhage extended up the innominate artery as far as it could be followed. It also extended up the pulmonary artery and into the hilus of the lung. There was some hemorrhage following the anterior descending branch of the left coronary artery for a distance of about 3 cm. but not encroaching upon the lumen of the vessel. Upon opening the aorta, marked atherosclerosis was seen. There was a transverse rent in the intima of the wall of the aorta about 3 cm. above the aortic ring 2 cm. in length. The right end of the rupture was at the orifice of the right coronary artery. Extending distally from the center of the transverse tear was a longitudinal tear 12 mm. long. The rupture appeared to extend through the wall to the adventitial layer of the aorta. The hemorrhage could be followed along the coronary artery, up the aorta and innominate and pulmonary arteries. The lungs were otherwise negative.

The liver weighed 2,400 grams. The surface

was roughened and on cut section the nutmeg was seen. The kidneys each weighed 160 grams. appearance of severe chronic passive congestion They were pale and had a granular appearance on cut section. The cortex could not be sharply distinguished from the medulla.

Examination of the brain revealed marked arteriosclerosis of the vessels. The cut surfaces of the brain were normal except for two small areas. One area showed encephalomalacia 1 cm. in diameter just above the posterior cornu of the right ventricle. Just below the cortex in the depths of the calcarine fissure on the right there is a thrombosed vessel measuring 2 mm. in diameter.

Anatomic Diagnoses: (1) Hypertension; (2) myocardial hypertrophy; (3) dissecting aneurysm of the aorta; (4) hemopericardium; (5) renal arteriosclerosis; (6) cerebral arteriosclerosis.

Discussion

DR. ANDRUS: In the microscopic examination of the aorta one sees the primary anatomic change encountered in cases of dissecting aneurysm. The change is that of medio-necrosis. The elastic fibers have become frayed and split and broken to give the wall a hyalin or granular appearance. The lesion does not appear to be inflammatory in any sense. It is not related to syphilis although syphilitic aneurysms do occasionally dissect. The lesion is also not related to atherosclerosis which is primarily an intimal change. This medio-necrosis appears to be a change produced by the aging process and it seems to be more marked in individuals who have had chronic hypertension. A very rare occurrence in this case was the dissection out into the pulmonary artery. The microscopic sections show that the dissection has extended out even to the finer branches. The pulmonary arteries do not show any medio-necrosis. The split in the aorta is between the medial two-thirds and the outer one-third of the blood vessel. Sections of the myocardium show marked hypertrophy of the muscle fibers, and the kidney shows the subintimal deposits of hyalin in the glomerular arterioles which is so characteristic of chronic hypertension. The kidney parenchyma itself appears to be functionally competent.

Dissecting aneurysm is not rare. There are several things that we might learn from this case. In the first place, it is primarily a disease of the media of the great conducting arteries. There is no inflammatory lesion and it is primarily not due to atherosclerosis. In fact, the tear in the intima is in most instances apart from an ulcer. A number of cases occur with some excitement which apparently elevates the patient's blood pressure. I remember doing an autopsy on a woman whose attack developed while she was attending an exciting gangster movie. Severe exertion apparently initiates some of the attacks. Occasionally, the aorta ruptures completely and this patient dies suddenly of what we speak of as spontaneous rupture of the aorta. The symptoms vary tremendously depending upon the course that the dissection takes. Most commonly there is hemorrhage into the pericardial sac so that the ventricles cannot fill during diastole and the patient dies after a short period of coma. Occasionally very unexpected symptoms occur. I remember examining one patient who was seized with a severe pain in his abdomen while walking to work. A few hours later he developed abdominal distension with pain. A diagnosis of intestinal obstruction was made. He died of a mesenteric infarction not due to embolism or to thrombosis but due to the extension of a dissecting aneurysm about the mouth of the superior mesenteric artery so that it was occluded. Another patient presented the complaint of severe pain in the back and anuria. In this case the dissecting aneurysm had occluded both renal arteries causing infarction of both kidneys. Occasionally, the aneurysm ruptures back into the lumen of the aorta and the patient may survive for some time with what we speak of as a healed dissecting aneurysm. It is very interesting to note that the new false passage becomes lined by endothelium and it may become the seat of atherosclerotic patches.

◆ CASE REPORTS ◆

PRIMARY MALIGNANT MELANOMA OF THE CHOROID

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MELANOMA of the choroid, a highly malignant type of growth, is comparatively rare. Statistics from large eye clinics reveal an average of only one such instance among 2,000 patients. As a result, it is difficult to obtain a large series of cases for detailed study. However, at Washington, D. C., in the American Registry of Ophthalmic Pathology, there are 1,600 cases of malignant intraocular melanoma. Colonels Callender and Ash[3] followed five hundred of these patients for five years or longer, and as a result made some very interesting observations.

From the Lenont-Peterson Clinic, Virginia, Minnesota.

Case Report

The patient, a white male, aged 58, was first seen at home on August 14, 1941. Following a light supper he was suddenly seized with severe abdominal pain, associated with nausea and vomiting. He was found writhing in pain and perspiring profusely and he was immediately transferred to the hospital.

Past Medical History—Patient had had recurrent attacks of tonsillitis over a period of years; chronic

prostatitis in 1938; and fracture of the first metacarpal of the right foot in 1938. An injury to the right eye in 1926, while employed as a sawyer at a lumber mill, had been apparently followed by complete recovery at the time, but ten years later, presumably the effects of the same injury necessitated the enucleation of the right eye. A tonsillectomy was performed in 1939. During the six months prior to admission to the hospital, the patient had had vague abdominal symptoms, a moderate secondary anemia and a slight loss of weight. A diagnosis of malignancy of the stomach was considered, but roentgenograms and laboratory findings would not substantiate it.

Physical Examination.—The patient, a rather emaciated male, was evidently in severe pain. The right eye was artificial; the left eye had an uncorrected vision of 20/25. The nose and ears were normal. The tonsils had been removed, and upper and lower dentures were present. The heart and lungs were normal. The entire abdomen was extremely rigid without any areas of localized tenderness. There were no palpable masses. A roentgenogram of the abdomen and chest was taken, but showed no evidence of subdiaphragmatic air.

Laboratory Findings.—Hemoglobin, 74 per cent; red blood cells, 3,940,000; white blood cells, 8,350. The differential blood count revealed 87 per cent polymorphonuclears, 10 per cent lymphocytes, 2.5 per cent monocytes, and 0.5 per cent eosinophils. Wassermann and Mantoux tests and the urinalysis were all negative.

Treatment and Course.—A tentative diagnosis of perforated gastric ulcer was made and a laparotomy advised. Upon opening the abdomen a small amount of clear fluid was encountered, and there were small masses of gelatinous material floating free in the abdominal cavity, suggestive in appearance of partially organized old bloodclots. The liver was enlarged and extended about three fingers below the coastal margin. It was thickly studded with nodules of a coal black color, varying in diameter from 2 to 3 mm. or 2 or more cm. Careful exploration failed to demonstrate any perforation of the viscus or other pathological changes besides those noted. A nodule was removed from the liver for biopsy. Postoperative inspection of the skin revealed no moles or scars suggesting previous removal of moles. Although the postoperative course was rather stormy, the patient was discharged on the eighth day with the abdominal wound well healed. In the five months that have elapsed since the operation, the man has shown a gradual, yet very marked, decline.

In a discussion of the findings of the exploratory operation with the patient's wife, it was learned that the right eye had been removed because of a malignancy. The attending ophthalmologist in 1936 stated that the patient gave a history of a severe injury, ten years previously, to the right eye. At that time there was facial swelling, but impairment of vision did not occur until about nine years later. Examination showed a severely inflamed right eye with a shallow anterior chamber and a fixed pupil. There was increased tension, a ground glass cornea, and detachment of both retina and choroid. Transillumination of the eyeball was poor, indicating some obstructive substance within the posterior chamber. Diagnosed as sarcoma of the choroid, the eye was enucleated. The malignancy was confirmed by the pathological findings.

The biopsy report of the nodule taken from the liver during exploratory operation in 1941 was as follows: "The black masses are formed by tumor tissue. Some tumor cells have the appearance of epithelial cells while others are elongated and spindle-shaped. The tumor cells have pale-staining, round or oval nuclei, and they are often loaded with a large amount of granular dark brownish pigment. Only few mitoses can be seen. The tumor tissue shows a marked tendency to infiltrate the surrounding liver substance. The diagnosis is metastases of a malignant melanoma to the liver."

Comment

Similar instances of primary intraocular melanosarcoma with metastases have been reported by Dejean,[5] Kreibig,[7] Lacroix,[8] Acki,[1] Fiessinger,[6] and others. Burch,[2] commenting on this case, stated: "In my experience I have seen this happen a number of times. Two years ago, I saw in a ward of a local hospital, a former patient from whom I had removed the eye for sarcoma five years previously. She had just had an exploratory laparotomy. The abdomen was closed without further operation after a malignancy of the liver was discovered. One of my cases developed a metastasis in the thyroid; another developed pneumonia six months after enucleation of the eye, and it was found at autopsy that she had a carcinoma of the lung. It is a common experience after melanosarcoma of the choroid to have metastases develop elsewhere sooner or later, even after a period of eight to ten years. Among some fifty-odd melanosarcomas of the choroid that we have in the University of Minnesota records, together with specimens submitted for examination, we have been trying to send out follow-up letters to ascertain the five- and ten-year cures and the number of metastases that have developed and their location."

Several theories as to the origin of ocular melanoma have been suggested. After making a study of serial sections of seven choroidal sarcomas, Theobald[10] showed that these tumors originate from the Schwann sheath cells of the ciliary nerves as they pass through the choroid. Similarly Masson[9] observed that all types of sensory and motor neural tumors have as a fundamental element a proliferation of Schwann sheath cells which are ectodermal in origin.

According to their microscopic appearance Callender[4] classified melanosarcoma:

1. Spindle cell type A and B
2. Epithelioid cell type
3. Fasicular cell type
4. Mixed cell type

The spindle type A has a good prognosis, whereas type B averages a 10 per cent malignancy. In the epithelioid type, the most malignant form of melanosarcoma, approximately 70 per cent of patients expire within ten years. The fasicular type is the next in predominance of metastases; while the mixed cell type has a variable prognosis. According to Callender[3] the total number of deaths from metastases, among 500 cases followed five years or longer, was 239, or 48 per cent; the mortality increased to 68 per cent among the 200 cases followed ten years or longer.

Malignant melanoma frequently develops in a blind eye of long standing, as noted in the case reported. Approximately 85 per cent of ocular melanomata are found in the choroid. The possibility of previous injury to the eye as an etiological factor is controversial. Following enucleation for melanosarcoma of the choroid, metastases have occurred even as long as twenty-four years later. Malignant melanoma of the eye is rarely found in children, as evidenced by only thirty-one recorded cases.

As with all malignancies, intraocular melanosarcoma

has a most unfavorable prognosis. Von Hippel[11] maintained that enucleation is useless except when done in the very earliest stages of the disease. Therefore, an early diagnosis should be of decided importance in lowering the mortality rate.

Summary and Conclusions

1. A case of primary malignant melanoma of the choroid with metastases is reported.

2. Callender's classification of melanosarcoma is discussed.

3. Attention is called to the variation in time that may elapse between the primary lesion and the development of metastases.

4. An earlier diagnosis of intraocular melanoma is the only way we now have to improve the prognosis.

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THE TREATMENT OF THYROID CRISIS
With Special Reference to the Possible Use of Spinal Anesthesia

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THE following case is presented because of the improvement noted following the use of spinal anesthesia in a case of severe postoperative thyroid crisis.

The patient was a white, married female, forty years old, who had had symptoms of hyperthyroidism for eight months. She had lost thirty-five pounds in weight in that time, was nervous, irritable, and had noticed a slight exophthalmos. Her appetite was excessive and her palms were always moist with perspiration.

Examination of the thyroid revealed a diffusely enlarged gland. There was slight exophthalmos. Her blood pressure was 140/80. Three basal metabolic rates had been plus 53, plus 32 and plus 20 per cent, while receiving Lugol's solution and sedation for one month. The pulse dropped from 120 to 90 during this time. Examination of the urine was negative. The hemoglobin was 65 per cent with 3,500,000 erythrocytes.

On May 13, 1941, a bilateral subtotal lobectomy was performed. The patient seemed to stand the procedure well, but that evening the pulse rose to 140 per minute, blood pressure 170/90, respiration 32 per minute and temperature 103.6 (rectal). She was restless and somewhat confused mentally. In the ten hour period since operation she had been given 2500 cc. of 5 per cent glucose in normal saline, two doses of morphine sulfate, gr. ¼, two doses of nembutal, gr. III, .15 gr. of sodium iodide intravenously, 60 minims of Lugol's solution in 200 cc. of tap water by proctoclysis.

When the author saw her in consultation about twelve hours after her operation, there was no question but that she had a thyroid crisis. The attending surgeon had tried everything that is usually given for this condition. It was decided to try to increase the sedation and also to give a blood transfusion. The next morning the patient was very restless and irrational. The nurse said that nembutal, gr. III every two hours for three doses, failed to quiet her. The patient's temperature was 104.6 (rectal), pulse 160 per minute, blood pressure 180/110, respiration 45 per minute and the patient looked as if she were going to die unless some relief were given shortly. It was then decided to try spinal anesthesia. Sixty milligrams of procaine hydrochloride (novocaine crystals) were given intraspinally in the third lumbar space. Anesthesia was obtained to about the fourth rib anteriorly, but it was not complete, as the patient could still move her legs after the anesthesia was given. The effect on the blood blood pressure, pulse, respiration and temperature was dramatic. The blood pressure fell almost immediately (shock-like phenomenon?), the pulse and respiration became slower, and the temperature was 100° about three hours later. The patient immediately became quieter and went to sleep. This was somewhat disturbing at first, but since the blood pressure was maintained above shock level, no great concern was felt. The anesthesia wore off in about one and a half hours. Following this, the patient was given phenobarbital, gr. I, t.i.d., and Lugol's solution gt. XV, t.i.d., and 3000 cc. of 5 per cent glucose, half in saline and half in triple distilled water, every twenty-four hours for three days. Twenty-four hours after the anesthesia, the blood pressure and pulse rose temporarily, but this was apparently controlled by nembutal, gr. III. The patient made an uneventful recovery and was discharged on the fourteenth postoperative day. When seen six weeks later, she said she felt better, had gained ten pounds, and was less nervous and irritable. Her basal metabolism rate was plus 12 per cent, pulse 90 per minute.

Discussion

The disturbing feature in the treatment of thyroid crisis or storm is that there is no specific therapy known to date. Fundamentally, the cause of this condition is still obscure. It is not certain whether the primary difficulty lies in the thyroid gland itself or whether other organs, such as the adrenal, liver, pituitary, etc., are the site of the disorder. If the primary organ at fault is the thyroid gland, it is unknown wheth-

From the Department of Surgery, University of Minnesota Medical School. Read before the Saint Paul Surgical Society, October 9, 1941.

er the symptoms are due to an excess of normal secretion or to an abnormal secretion. Crile seems to believe that the adrenals are at fault in thyroid crisis. Maddock, Coller and Pedersen have found "adrenalin" in the peripheral venous blood of some patients with reactions to hyperthyroidism, the quantities found suggesting a direct relationship to the severity of the reaction. Lahey states that in his opinion "most thyroid deaths are largely liver deaths." The results of the thorough review by Foss, Hunt and McMillan showed that neither the heart, liver, thyroid or thymus alone seemed to be at fault in thyroid crisis. In their opinion there was no proof that thyroid crisis followed sudden hypersecretion of thyroxine, epinephrine or both. Good summaries of the present concepts of thyroid crises are given by Foss, Hunt and McMillan and also Pemberton. One reason why postoperative crisis, in association with typical exophthalmic goiter is now uncommon, is that these patients are given careful preoperative care. The importance of mental and physical rest, by environment and drugs, high caloric intake and the judicious use of iodine, chiefly in the form of Lugol's solution, is well recognized.

Concerning the operation for hyperthyroidism, there is no question that in selected cases stage procedures have lessened the incidence of postoperative reactions. It is interesting to note how in recent years stage procedures have passed from those of necessity to those of election. Postoperatively, it is important to watch the blood pressure, pulse, respiration and temperature, because if they begin to rise, one should suspect a thyroid storm or crisis. When a thyroid crisis begins or seems imminent, the therapy consists of the judicious administration of sedation; iodine medication by vein, mouth or rectum; oxygen therapy, intravenous glucose and fluid; cold compresses; etc. Occasionally blood transfusions have been given. It would be interesting to see what effect transfusions of blood from patients with myxedema would have on patients with a thyroid storm.

Occasionally, however, in spite of the above measures, the patient does not improve. In such instances, the use of spinal anesthesia might be considered. Crile has reported beneficial results following spinal anesthesia in a few cases of thyroid crisis. Bartels, Stuart and Johnson tried it in one case. While the immediate clinical improvement was striking, the patient subsequently died.* The procedure is not irrational, on the basis that spinal anesthesia temporarily denervates the adrenal glands.

It is not the purpose of this paper to recommend the use of spinal anesthesia in the routine treatment of thyroid crisis. In fact, there are several objections that might be voiced against its use: (1) Spinal anesthesia is not a harmless form of therapy in itself and its use in an ill patient is not without danger, (2) there is no definite proof that the adrenal glands are primarily at fault in thyroid crisis; (3) the *post hoc, ergo propter hoc* type of reasoning is dangerous, especially when other medications were used; and (4) thyroid crisis may cure itself spontaneously.

On the other hand, the whole treatment of thyroid crisis is symptomatic and until a specific cause and treatment for the condition is known, the therapy will be rather empirical. It would seem justified to use spinal anesthesia in selected cases when the usual methods of treatment of severe thyroid crisis have failed. Until more cases reporting the use of spinal anesthesia in thyroid crisis are available, enthusiasm or wholesale application of this procedure is not warranted.

Summary

A case of severe thyroid crisis following bilateral thyroid lobectomy successfully treated by spinal anesthesia is reported. Some general ideas regarding the cause and treatment of thyroid crisis have been discussed. A plea for conservatism in the use of spinal anesthesia in thyroid crisis is made.

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*In personal communications to the author, Dr. Emil Goetsch, Dr. R. B. Cattell of the Lahey Clinic, and Dr. J. de J. Pemberton of the Mayo Clinic, stated that they had no personal experience with the use of spinal anesthesia in the treatment of thyroid crisis.

SCIENTISTS URGED TO SAVE VALUABLE JOURNALS

Scientists feeling the patriotic urge to turn over to waste-paper collectors piles of old technical journals which they no longer need are urged to look them over first with an eye to their possible use in rebuilding war-damaged libraries abroad. Many such libraries have lost all or part of their files of scientific periodicals, or have been unable to keep them complete due to interruption of the mails or loss of shipments at sea.

The American Library Association has appointed a special committee which is functioning under the chairmanship of John R. Russell, librarian of the University of Rochester, N. Y. Scientists who have accumulations of old journals are requested to write to Mr. Russell, before turning them over to waste-paper drives.—*Science News Letter*, April 25, 1942.

HISTORY OF THE MINNESOTA STATE MEDICAL SOCIETY

By ARTHUR S. HAMILTON, M.D.
Minneapolis, Minnesota

(Continued from April issue.)

Sixth Annual Meeting

The sixth annual meeting of the Minnesota State Medical Society was held in the Grand Army Hall, Saint Paul, on February 3 and 4, 1874, with Dr. W. W. Sweney presiding and forty-five members present.

In his opening address, Dr. Sweney referred to the death of Drs. Noyes, Smith, Chance, Jones, Etheridge, Bingham, Willey and Reiner, and urged that the Society take steps to recommend the establishment of a National Department of Public Health. He also urged the Society to take final action on the rights of women to become members.

Dr. T. T. Mann requested that the Committee on the Influence which the External Aspects of Nature Exercise upon the Imagination and Understanding of Man be continued another year, and this was granted.

No official mention is made of the omission of the semi-annual meeting of 1874, but since previous to the adjournment of the meeting of February 3, 1874, the Society moved to adjourn until the first Tuesday in February, 1875, it must be assumed that the semi-annual meeting was omitted intentionally.

Seventh Annual Meeting

The seventh annual meeting of the Minnesota State Medical Society was held in the Supreme Court Room, Saint Paul, on February 2 and 3, 1875, with Dr. N. B. Hill in the chair, and forty-five members present.

Dr. Hill referred to the death of Drs. Potts, Richardson, Grant and Ames, and gave the following extract from a Minneapolis paper, printed at the time of Dr. Ames' death: "Dr. Ames was one of the most upright citizens that ever lived. He was one of the most temperate and correct men in all his personal habits. He was methodical in the extreme, jotting down in his private diary the principal events of his own life, and those of the city and state around him."

Dr. Hill also referred to the improvement in the state law dealing with post-mortem examinations, and the question of recognizing the right of women to membership in the State Society.

On account of the serious illness of Dr. Hill, which came in the form of a stroke of apoplexy on the morning of the meeting, the vice president, Dr. A. B. Stuart, became presiding officer.

The Committee on New Members submitted a list of applicants for admission, divided into two groups: those presenting diplomas, and those without. Those of one group, as having presented diplomas, were elected to membership.

Later in the meeting, eight additional new members were elected. It is not stated whether these men presented diplomas, but certain things in the context

suggest that they did not. Some are reported as graduates of a medical school and some are not.

Dr. Reynolds of Fergus Falls made application for membership, but this was not acted upon on the ground that his diploma was not presented, and no one was present who had any personal knowledge of him.

Amendments to the Constitution and By-Laws were adopted as seen in another chapter.

On motion, Dr. C. N. Hewitt was called upon to read the annual address of the president, Dr. N. B. Hill. Before reading the address, Dr. Hewitt explained that when he had been in Minneapolis a week previously, he had taken tea with Dr. Hill, who had then shown him the address, and had stated he was anxious to have it received by the Society, as he thought it would be the last effort of this kind he would ever make. Consequently, when Dr. Hewitt saw the manuscript in Dr. Hill's pocket at the time of his stroke, he had taken it out and ventured to present it to the Society.

Dr. Hill's closing address appears in the Transactions for 1875, and is a notable paper, calling attention to many practical points in the practice of our profession, and urging physicians to a higher moral and professional plane of living. He recommended the continuance of the registration of all the regular practitioners in the state, as the only means the public has of distinguishing between the properly qualified practitioners and the mere pretender. Attention was called to the unsatisfactory situation existing in medico-legal matters (unfortunately still existing), and the appointment of an impartial committee of three was urged to pass on all matters of expert testimony. The relation of physicians to public health problems, and the importance of prevention as against cure in the matter of disease was stressed.

At this meeting, the Committee on the Influence which the External Aspects of Nature Exercise upon the Imagination and Understanding of Man, was discharged without report, and we are forever denied what might have been an interesting contribution to medicine.

The Transactions for 1875 contain a copy of the amended Constitution and By-Laws of the Minnesota State Medical Society and also the Code of Ethics of the American Medical Association.

Eighth Annual Meeting

The eighth annual meeting of the Minnesota State Medical Society was held in the Supreme Court Room, Saint Paul, February 1 and 2, 1876, under the presidency of Dr. J. H. Stewart, Dr. N. B. Hill having died with a stroke of apoplexy the preceding February. Sixty members were in attendance.

Dr. Stewart's address on "Professional Etiquette" was well received, and contained many wise admonitions and some highly moral suggestions, couched in rather flowery and sometimes witty language, as to the doctor's behavior.

The date of the annual meeting was changed from the first Tuesday in February to the third Tuesday in June.

The report of the Committee on Surgery contains three carefully studied and well-reported cases by Dr. Franklin Staples on "Plastic Operation of the Lower Lip"; "Fibroid Tumor of the Ischiorectal Fossa," and "A Large Adenoid Tumor of the Neck."

In the report of the Committee on Obstetrics appear some notes by Dr. H. H. McMahon on "Obstetrical Observations Among the Chippewa Indians of Minnesota." At the time the notes were written, Dr. McMahon had been in active practice for one year and most of his practice was among the Chippewas, but

in that period he had not attended a single case of obstetrics among the Indians as, by their custom, male help is totally proscribed in such cases. During a residence of two years among the Indians he had not heard of a single case of difficult labor, but he had seen one case of puerperal mania. When seen, the woman was tied with a rope around her waist and was "raging wildly about the wigwam as far as the rope would permit." She had no medical treatment but ultimately fully recovered.

In one case of miscarriage, the doctor saw his patient about two hours afterward, and she was then on her knees in the wigwam washing the clothes. It was customary among the women to get up immediately after the child was born and go to work, or, if delivery occurred while on the march, as soon as it was over the mother picked up her pack and proceeded on her journey. Nevertheless, uterine disease of any kind was extremely rare among the Indians, and the doctor knew of no instance of prolapse of the uterus.

The old women usually attended the cases of childbirth, and went prepared with roots and herbs of some kind which they administered with a view of promoting uterine contractions. They had no knowledge of turning the child but Dr. McMahon had heard that there were cases where they dissected the fetus *in utero,* with no other instrument than the common scalping knife.

The Committee on Obstetrics also reported on the use of forceps as a means of compression of the fetal head as well as for traction purposes.

It is worthy of note that many of the reports on special subjects in medicine and surgery are given in much detail, refer at length to new procedures and serve much the same purpose as our present-day annual reviews on different aspects of medicine.

The Committee on Gynæcology reported three successful ovariotomies in Minnesota during the preceding year.

As chairman of the Committee on Necrology, Dr. O. J. Evans of Minneapolis reported on the death of Dr. N. B. Hill, the only death of the year.

Dr. Milligan and Dr. T. H. Evarts moved that the Minnesota State Medical Society urge upon the Legislature the necessity for the immediate organization of an inebriate asylum, it having come to their attention that the state senate had voted the disestablishment of the Minnesota State Inebriate Asylum established the preceding winter, and the House was strongly urged to nonconcur in the action of the Senate.

The delegates elected to the International Medical Congress to be held at the Centennial Exposition in Philadelphia were: Dr. A. B. Stuart from the First Congressional District; Dr. C. N. Hewitt, from the Second Congressional District; Dr. C. E. Smith, from the Third Congressional District.

Frequent reference is made in medical articles of this period to laudable pus, and there is also considerable discussion on the diagnosis of typhilitis and perityphilitis.

Ninth Annual Meeting

The ninth annual meeting of the Minnesota State Medical Society was held in the Senate Chamber at Saint Paul on June 19 and 20, 1877. Dr. F. H. Milligan presided and sixty-four members were present. Dr. Milligan urged compulsory vaccination; a committee to examine all persons desiring to become druggists or apothecaries, and that suitable provision be made by the United States for the families of the discoverers of anesthesia.

Dr. Milligan's presidential address was entitled "What Has the Science of Medicine and Surgery Done to Benefit Mankind?"

Dr. Staples presented a paper on carcinomatous infections and illustrated it with crayon sketches, photographs and pathological specimens. It is noteworthy that Dr. Staples' prize essay in a previous contribution was illustrated by drawings, the first of which I have found any record in the Society.

Dr. Hewitt urged the Society to aid in practical temperance reform, and asked that a committee of three be appointed whose duty it should be to collect facts bearing upon the use and abuse of alcohol in the state, to report next year and, if possible, to suggest a remedy. Drs. Dodge, Hewitt and Craft were appointed.

Tenth Annual Meeting

The tenth annual meeting of the Minnesota State Medical Society was held at St. Peter on Tuesday and Wednesday, June 18 and 19, 1878. Dr. Otis Ayer presided.

An unusually large number of new members were admitted.

Dr. Adams announced that Dr. J. H. Murphy had been elected as one of the vice presidents of the American Medical Association.

Reference was made to a resolution passed the preceding year on the subject of "Shortening in Fractures of the Long Bones," and to a paper on "Congenital Irregularities in the Length of the Lower Limbs." A committee consisting of Drs. J. H. Murphy, E. J. Davis, S. Blood, J. E. Bowers and S. B. Sheardown was appointed to collect statistics on the congenital difference in the length of lower limbs. Obviously, all this suggested unusual activity in malpractice suits.

A resolution passed by the Society earnestly urged the legislative assembly of the state to so amend existing laws as to require medical experts to hear fully the evidence on both sides of the suit before expressing an opinion, in the several courts of justice of this state.

Under the heading of "Reports on Surgery," Dr. A. B. Stuart of Santa Barbara, California, formerly of Winona, made some comment on the climate of California in relation to injuries and disease. It was his opinion that recent incised and lacerated wounds acted more kindly and healed more rapidly on the Pacific Coast than on the Atlantic Coast or in the Valley of the Mississippi. Broken bones, on the other hand, did not unite more rapidly than in the eastern states, and this disagreement in the healing power of the two tissues was referred to, but was accepted as beyond explanation, except that ozone, which Dr. Stuart calls vitalized oxygen, was considered more abundant on the Pacific than on the Atlantic Coast.

On Wednesday afternoon and after the final adjournment of the Society, its members were afforded an opportunity, through the kindness of Drs. Bartlett, Bowers and James of the Hospital for the Insane, of visiting that institution. Most of the Society had never previously visited the hospital. There was general approval of the admirable arrangement of the hospital, its surprising extent, and its excellent administration.

(To be continued in the June issue)

President's Letter

SICKNESS INSURANCE—THE MAY DAY PROCLAMATIONS

I

THE members of the State Association can be assured that even in this time of stress the question of sickness insurance is receiving careful consideration. Our Committee on Sickness Insurance under the chairmanship of Dr. A. W. Adson has been active. Certain members of the Committee attended the Conference on Medical Service Plans in Chicago last February; a report of this conference can be found in the April issue of MINNESOTA MEDICINE, page 290. Since then the Committee has formulated a program of study for the situation in Minnesota.

In general, there are four types of medical service plans: (1) the cash indemnification plan, which is chiefly exemplified by policies written by the commercial insurance companies in which claims are paid directly to the client; (2) the group clinic plan, and the consumers' group health plan in which different types of medical service are given directly to the patient for a certain fee per month; (3) the voluntary prepaid medical service plan sponsored by medical societies, and (4) the compulsory prepaid medical service which would be controlled by the state or federal government. It is estimated that about 6 per cent of the population of the United States, or approximately 7,000,000 persons, subscribes to sickness and accident insurance of the cash indemnity type. About 150,000 persons are served by means of group clinic and consumer plans, and 750,000 persons by voluntary prepaid medical service plans. Additional material on the various plans is being assembled for the meeting of the American Medical Association in June, at which time the permanent organization of prepaid medical service plans will be given consideration.

The Committee on Sickness Insurance of our State Association has appointed two subcommittees: one, to study the question in the urban areas and the other in the rural areas. It is felt that the problem may be different in these two areas. A subcommittee also was appointed to make a study of enabling acts which are now in force in various states and to consider the preparation of an act which might be suitable for Minnesota. The results of the studies of these subcommittees will be available at the time of the annual meeting in Duluth, and members of the House of Delegates should be prepared to enter into a discussion on this question.

Medical service plans of the type under consideration have nothing to do with the care of indigents. Subscribers to plans of this type can be only those who can afford to buy the service. Care of indigents is an independent topic. The most important questions to be decided concerning medical service plans are whether or not an enabling act should be sponsored, whether some service plan on a state-wide basis is advisable, and whether a satisfactory plan for this service can be found. The effects of such plans on the quality of medical care, the advancement of medical science and medical art, and the physician-patient relationship are larger aspects of the problem. Innumerable details must be considered; for example, x-ray and laboratory services, pediatric, obstetric and psychiatric care, refraction, the services of the specialist, and actuarial bases for estimating insurability. A conception of these can be obtained from the publications of the American Medical Association and The Actuarial Society of America.

II

The May Day proclamations of President Roosevelt and Governor Stassen on vaccination and immunization were a great help to physicians and public health officers. The campaign for vaccination and immunization in Minnesota has been, of course, a continuous campaign for these many years. It was recognized two years ago by the Council of the Minnesota State Medical Association that more active measures would be necessary, and since that time much has been accomplished through the activities of Dr. L. R. Critchfield and his Committee on Vaccination and Immunization. In spite of exceptional accomplishments at this time, the campaign will carry over into the summer and become again a continuous campaign on the part of the State Board of Health, the State Medical Association, and all the lay organizations affiliated in this work.

The necessity for vaccination of adults should be emphasized. Many adults have not been vaccinated for twenty-five years, whereas vaccination every six or seven years should be recommended. Adults hesitate to be vaccinated because of their favorable past experience. They do not realize that if we should have an epidemic of malignant smallpox as we had eighteen years ago, undoubtedly many of them would be susceptible.

H. Z. Giffin

President, Minnesota State Medical Association

EDITORIAL

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BUSINESS MANAGER
J. R. BRUCE

Volume 25 MAY, 1942 Number 5

CHEMOTHERAPY AND TUBERCULOSIS

THE progress made in recent years in the elaboration of chemicals which have a specific effect on pathogenic organisms constitutes, not simply a milestone in medicine, but it is to be hoped, the beginning of an epoch in the history of therapeutics.

It is only through further research that new chemicals can be discovered which will be more effective and perhaps less toxic than those now used clinically in the treatment of a number of infections. Only by this means (our anti-vivisection friends, please note) can new chemicals be elaborated with specific therapeutic value in additional infections.

Although the mortality in tuberculosis has been agreeably reduced during the past twenty-five years, the infection still is an important enemy of man. The progress in combating the disease has been made largely through sanatorium care and segregation, building up nature's resistance and the various newer operative procedures.

It would seem that the dream that some chemical could be discovered which would have a specific deleterious action on the tubercle bacillus, in spite of its inaccessible location in the tubercle is not beyond the realm of possibilities.

The paper entitled "Chemotherapy in Experimental Tuberculosis" by William H. Feldman of the Division of Experimental Medicine of the Mayo Foundation, which appears in this issue of the journal, reports the definite beneficial effects of a new chemical called promin on induced tuberculosis in guinea pigs. The next step will be its clinical trial. The evidence of its value experimentally is so striking that we welcome the opportunity of presenting the report to our readers.

Dr. Feldman was assistant professor of pathology for ten years at the Colorado State College before he joined the staff of investigators at the Institute of Experimental Medicine of the Mayo Foundation. The report constitutes an address given under the John W. Bell Tuberculosis Lectureship before the Hennepin County Medical Society in February. The lectureship was established in May, 1930, by the society in memory of Dr. John W. Bell, a prominent internist of Minneapolis, who died in 1933 after practicing in that city for fifty-one years. The lectureship constitutes a continuation of the fight against tuberculosis in which he was a pioneer as a founder of the Hennepin County Tuberculosis Association.

SISTER KENNY

SISTER KENNY has made a valuable contribution to the treatment of poliomyelitis. After a thorough trial of her method at General Hospital in Minneapolis this is the conclusion

of the orthopedists who have observed the results.

During her work as a trained nurse in the bush country of Australia, Sister Kenny encountered a few children suffering from acute poliomyelitis. Not knowing the orthodox medical treatment of the acute disease, she made the observation that there was muscle spasm, tenderness and increased irritability in the unaffected muscles. She discovered that this could be overcome by the use of hot moist applications. The spasm relieved, deformities were less likely to occur and the paralyzed muscles, as they resumed at least a part of their function, were enabled to act with less interference.

Upon regaining medical contact, Sister Kenny immediately realized that her results were far better than those attained by the orthodox method of splinting for six weeks, and then more splinting. With pertinacity born of conviction she tried to convince the profession of the value of her discovery. She made little or no progress in her own country (a prophet is not without honor save in his own country) and it was not until she was given the opportunity to demonstrate her method in Minneapolis that she made any headway. It is said that medicos who come to scoff leave convinced.

Sister Kenny's treatment further includes the training of affected muscles. She speaks of mental alienation which, although difficult to explain, means the absence of voluntary muscle response due to the experience of pain in previously attempting such movement. Patient, passive and active muscle movement with retraining of muscle action within the ability of the disabled muscles, and coördination of muscle action are among the ends sought.

Sister Kenny's treatment is not a cure-all. It does not restore destroyed anterior horn cells. It does afford the individual a chance to use what muscles are able to function by preventing contractures. Braces and supports will still be needed in certain cases. Even orthopedic surgical procedures will still be needed in some cases. But that there will be less need for such treatment is the conviction of those who have observed the results of Sister Kenny's method.

Training courses for physicians, nurses and physical therapy technicians are being instituted so that wider use of this method will be possible.

WAR SESSIONS OF THE AMERICAN COLLEGE OF SURGEONS

LAST January the Regents of the American College of Surgeons voted to institute a series of twenty-five one-day sessions in different localities throughout the country for the benefit of the medical profession, these sessions to be devoted to the consideration of medicine and surgery in military service and civilian defense. Every state will be provided for, either singly or in combination.

On Friday, May 1, a meeting of the profession of the states of North Dakota, South Dakota and Minnesota was held at the Radisson Hotel in Minneapolis.

The program included the latest and most authentic information on war medicine and surgery, including such subjects as shock, the treatment of open wounds, burns and fractures.

Besides local surgeons, Dr. A. W. Adson of Rochester, Minnesota, spoke on "War Injuries of the Face and Skull." Fractures was the subject of Dr. Paul B. Magnuson of Northwestern University Medical School. Representatives of the Medical Department of the Army and Navy spoke on the organization and functions of their respective departments. Dr. Wallace Hunt of Omaha presented information on the doctor and hospital in civilian defense. The Procurement and Assignment Service was presented by Dean Diehl of Minneapolis.

These valuable meetings are being held for the benefit of the profession at large and some of the addresses will appear at an early date in MINNESOTA MEDICINE.

AMERICAN COLLEGE OF PHYSICIANS' MEETING

THE annual meeting of the American College of Physicians, held in Saint Paul last month, was well attended considering the fact that our country is at war. Some 1,377 physicians registered. The program reflected the present trend of medical interest and the effect of war on medical thought was evident. With nearly a dozen clinics taking place simultaneously each morning, and half as many panel discussions occupying each noon hour, a five-ring circus would have been infinitely easier to follow.

With the world as a battleground, the profession has suddenly become conscious of the inadequacy of medical training in this country in

tropical medicine. Already our young men are in the tropics and thousands more will follow them. They will encounter diseases against which white men have poor resistance. Medical officers will be confronted with problems of sanitation, vital for the preservation of the health of our soldiers.

Vaccination against smallpox, typhoid and tetanus is routine. For troops designated for certain disease infested areas, additional vaccination will be provided. But for such diseases as malaria, amebic and bacillary dysentery, cholera, typhus and plague, sanitary methods must be relied upon, if our fighting units are to be kept fit. The experience of our forces on the Bataan Peninsula has demonstrated what tropical disease can do to troops. And after the war the scene is set, even in Minnesota, with the known presence of the anopheles mosquito in our river valleys for the spread of malaria of virulent type from returned infected soldiers. There is a great need of concentration on the subject of tropical disease in our medical schools, as well as among physicians in army and civilian practice.

Aviation medicine was touched upon at the meeting of the College. Many were disappointed that the war prevented Captain Poppen and Major Armstrong from attending and presenting their addresses on this subject. More has to be learned concerning the effect of sudden changes in atmospheric pressure, oxygen tension and speed on human physiology.

Recent work on poliomyelitis was presented, which tends to show that this disease may be an alimentary rather than a respiratory infection. Doctors Paul and Trask of the Yale University School of Medicine presented the results of their investigations, for which they received the John Phillips Memorial Medal awarded by the College.

The endocrines received considerable attention. The whole subject is in the process of development and is somewhat controversial. The practical application of present knowledge derived from animal experimentation is still somewhat limited and the profession was warned against the useless and even dangerous use of some of the preparations.

Geriatrics received considerable attention on the program. The ever-increasing proportion of older people in the population will require an increasing proportion of medical services. Every man at sixty is not ready physically or mentally to retire. Some have just reached their greatest efficiency with their judgment developed by experience, and while they have lost the elasticity of youth and are not material as airplane pilots, they are most valuable members of society. The routine retirement by industry on a basis of age attainment alone is deplorable.

At the Convocation 302 newly elected Fellows assented to the Fellowship Pledge of the College.

At this session Dr. Roger I. Lee of Boston retired from the presidency and Dr. James E. Paullin of Atlanta took over the leadership. Dr. Ernest E. Irons of Chicago is president-elect. Dr. Charles H. Cocke of Asheville, North Carolina, was elected first vice president; Dr. Henry R. Carstens of Detroit, second vice president, and Dr. A. Comingo Griffith of Kansas City, Missouri, third vice president. Dr. W. D. Stroud and Dr. George Morris Piersol, both of Philadelphia, were reëlected treasurer and secretary-general, respectively. The session will be held in Philadelphia in 1943.

BUY WAR BONDS

AMERICA today needs the coöperation of every citizen—the man in uniform, the worker on a production line, the professional man, the woman in the home. Those of us in medicine are well aware of our obligation to the nation. We are willing and eager to provide the best of our professional service to the armed and civilian forces abroad and at home. We will share also the responsibility of providing money for the greatest war machine America has ever known. There must be no fiscal barrier in our war effort.

We are paying higher taxes than ever before, it is true. But increased tax revenues will not meet the annual costs of war. The Government can secure a part of the money from banks and other lending agencies, but extensive borrowing from these sources contributes to inflation. To borrow the money, yet to avoid the inflation threat, the Government asks for loans from all Americans through the purchase of United States Savings Bonds. By investing our money in the nation's war securities we build toward our own future security.

There are registered, interest-bearing bonds for us as individuals and for all medical associations. Series E Bonds are the "People's Bonds" which can be purchased only by individuals. The smallest costs $18.75 and pays $25 at the end of ten years—a 33⅓ per cent increase in value. Series F Bonds are also appreciation bonds, but

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MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the
Minnesota State Medical Association
George Earl, M.D., Chairman

ENROLLMENT FORMS ARRIVE

The long-awaited Medical Enrollment Form from the Procurement and Assignment Service is at last off the government printing presses. It arrived in the offices of Minnesota doctors April 22.

This is the form which is designed to put every doctor in the United States in the service of his country, to be used wherever he will be most valuable.

Each physician who fills it out and returns it to the Executive Officer of the Procurement and Assignment Service will receive a certificate and lapel button to indicate that he is ready to meet his country's need. If he remains at home, it will be because he is needed at home. At the same time he stands ready to serve in any essential civilian activity as well as in the armed forces, if the agency calls him.

The questionnaire and enrollment forms previously returned to the American Medical Association and to the Procurement and Assignment Service are now being utilized to meet requests coming in daily from the armed forces and other agencies. Names selected from these forms are sent to state procurement committees and through them, to local county committees for information on availability.

All Should Fill Them Out

Future needs for both military and civilian services will all be met through the Procurement and Assignment Agency and the new forms will be used in the same fashion. All are requested to fill them out including those who filled out the previous one from which selections are now being made. The additional information, it is pointed out in the letter from Dr. Frank Lahey, president of the American Medical Association, which accompanies the form, will bring up to date the facts necessary to place each medical man in the country in the work for which he is best qualified.

Minnesota's record for returning the first American Medical Association questionnaire was close to the top. Officials are confident that the response to the new questionnaire will be equally prompt and satisfactory.

ATTENDANCE AT MEDICAL MEETINGS

Physicians can be divided into two great groups according to Dr. Henry A. Christian of New York in a message mailed recently to members of the American College of Physicians. These groups comprise those who are learning and those who are forgetting, those who each year know more and those who each year know less. There seems to be no third group, he says, no group that remains stationary.

Dr. Christian's message was sent to stimulate attendance at the Physicians' meeting in St. Paul but applies with equal point to attendance at the 89th Annual Meeting of the Minnesota State Medical Association in Duluth. The state meeting is scheduled for June 29, 30, and July 1 at the Duluth Armory and, as always, it will be one of the most important Northwest medical gatherings of the year. Like the meeting of the College, this also is a chance to increase in knowledge.

"A few physicians increase in knowledge from within and grow from their own doing," Dr. Christian says. "These are innate investigators. The rank and file require outside help to grow and to progress. Books, meetings, discussions, teachers are our armamentarium for progress. Like the spring tonic of past days, all of us need some of this medicine, at least annually, better if it comes more frequently. A large majority of physicians know of their need and seek treatment.

Knowledge Not Static

"Things in nature rarely are static; they increase or they decrease; they grow or they decay;

they progress or they retrogress. Man's education in many respects resembles things of nature; rarely is it static. When knowledge does not increase, almost always it decreases. Physicians should remember this and make every effort to keep out of the static state and on the side of increase of growth, progress.

"Contact with colleagues eager to learn, listening to discussion by those capable of teaching, witnessing demonstrations and clinics, seeing scientific exhibits lead to more reading and better observation of patients. Herein lies medical progress."

The meeting of the Minnesota State Medical Association provides just these opportunities. Attendance at this meeting is a potent way for a physician to get himself out of the group of those who each year know less. The stimulus received from attendance at a medical meeting where men eminent in the profession speak lasts long after the meeting is over.

TROUBLE IN NEW YORK

Physicians who secure for themselves exclusive privileges under special legislation for the organization and operation of prepayment plans for medical service may find themselves in an embarrassing and difficult position if the plans they start are not successful.

The preliminary report recently issued by the Superintendent of Insurance of New York State finds that progress of the non-profit indemnity corporations (controlled and administered by physicians) has been unsatisfactory in New York for example. His department feels, he says, that a modification in the law which permits medical organizations, only, to operate plans for medical service, is needed.

As a result a bill has already been introduced at the 1942 session of the New York State Legislature which would permit hospital corporations to supplement contracts for hospital service by furnishing provision of indemnity against physicians' fees and obstetrical care.

Here, in part, is what the Superintendent of Insurance has to say about the matter:

"Progress Unsatisfactory"

"Although progress made by the hospital service corporations has been satisfactory, that of the non-profit medical indemnity corporations has been discouraging, particularly in the New York City area. One received a license during 1941 which brought the total of such licensed corporations to five. Three of these are in the metropolitan area, one in Buffalo and one in Utica. Permits to solicit subscribers have been issued to two additional corporations, both of which are located in the metropolitan area. At the end of 1941, the outstanding contracts numbered less than 10,000.

"The Department has recognized from the outset that for many of these plans to be successful they must have substantial support of the medical profession. In Buffalo and Utica the doctors in general have supported the plans and this may account to some extent for the greater progress they have made. In the metropolitan area the Medical Expense Fund of New York, Inc., is the only one to date which has received any substantial backing from the medical profession. Inasmuch as that corporation did not receive its license until August, 1941, sufficient time has not yet elapsed to ascertain how successful it will be.

"Premium is Deterrent"

"The sponsors of the plans have underestimated the time and money that is required in developing and in adequately bringing this type of insurance coverage to the attention of the public. It is now generally understood that these plans will not sell themselves. There are indications that the amount of premium charged is deterrent to the sale. It must be recognized, however, that the doctors to join in a plan must have some reasonable assurance of receiving a reasonable return for their services. To provide coverage at a fee which is attractive to the public on the one hand, and is acceptable to the doctors on the other does offer a real problem. It is undoubtedly true that persons in poor financial circumstances could not afford to pay the subscription fees charged by most of these plans. It is frequently stated by the medical profession that they are willing to treat even free of charge those who are unable to pay, but that they do not feel they should be called upon to furnish for an inadequate amount care to those who can afford to pay. It is to meet this situation in part that one of the plans provides for a graded scale of fees to be paid by the subscribers in accordance

with their income, although the services received would be the same for everyone.

Appeal of Surgical Benefits

"A greater appeal seems to exist for surgical benefits rather than for general medical coverage. This is due perhaps to the possibility of being confronted with much more substantial bills for surgical services than for general medical expense. It is understood that the plans contemplate experimenting to a greater extent in this field. To facilitate the extension of surgical benefits it has been urged that an existing hospital plan which has the minimum surplus of $150,000 required of newly organized mutual accident and health companies could be given an additional power of including surgical benefits in its subscribers' contracts, such benefits to be graded according to a fixed schedule of surgical operations. This schedule would represent the maximum payments by the plan at any time and the contract would not interfere in the relations between the surgeon and the patient since the contract would be one of indemnity rather than service. Where the charter powers were so enlarged the law might provide for some representation by participating surgeons on the board of directors of the particular hospital plan. The Department feels that a modification of the law granting this additional power would be proper and desirable in order to permit further experimentation as present methods do not seem to be meeting the immediate problem of medical and surgical care for a substantial proportion of the population."

Step Toward Lay Control

Officers of the Medical Expense Fund of New York are rightly disturbed by the situation. They see that passage of the bill now in the legislature, known as the Hampton Bill, would open the way for the practice of medicine by hospitals, with hospital insurance corporations in control of rates, physicians' fees and solicitation of public participation from all economic levels . . . a long step toward lay control of medicine and the end of private practice, they declare.

They see, also, that the position of the Insurance Department is reasonable. They themselves have acknowledged the need by their experiments with prepayment service. They have also taken steps to prevent others from stepping in where they fail.

"If the medical profession does not have a sufficient interest in the promotion of voluntary cash indemnity insurance," they point out in a recent bulletin on the subject, "then the Insurance Department wants to give the hospital plans the opportunity to make a success of it . . . to bring about a satisfactory participation of both the public and the profession.

". . . If We Fail"

"Eight months remain," they point out to their physician members, "in which we must promote voluntary non-profit cash indemnity insurance to success comparable with hospital service insurance or the opportunity of control over medical insurance will pass from our hands. The 1943 session of the Legislature will surely pass the Hampton bill if we fail."

The moral in all this is clear. Medical organizations must be sure of their ground and their plan must be as sound as they can make it, before they ask for exclusive privileges from the Legislature. After that they must promote their plans with the utmost vigor. If success is possible, they must be successful because others will be waiting to push their claims and the legislature will not be likely to turn a deaf ear to them if the doctors fail.

MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

J. F. Du Bois, M.D., Secretary

Hutchinson Osteopath Pleads Guilty to Abortion

Re: State of Minnesota vs. Solon L. Leonard

On March 30, 1942, Solon L. Leonard, sixty years of age, a duly licensed osteopath of Hutchinson, Minnesota, entered a plea of guilty in the District Court of McLeod County, to an information charging him with the crime of abortion. The defendant was sentenced by the Hon. Joseph J. Moriarty, Judge of the District Court, to a term of not to exceed four years in the State Prison at Stillwater, and was placed on probation. Prior to suspending the sentence, the defendant and his attorney stated to the Court that Leonard would not re-open his office in Hutchinson, would make immediate arrangements to dispose of his home, and would leave the community to live elsewhere.

The defendant was arrested on March 25, 1942, following an investigation by Mr. Frank Broderius, Chief of Police of Hutchinson; Mr. William O. McNelly, County Attorney of McLeod County, and the State Board of Medical Examiners. The defendant had been under suspicion for some time, and in the instant case, had performed a criminal abortion on March 19, 1942, on an eighteen-year-old married girl who resided in Renville County. The defendant admitted to Chief Broderius and a representative of the Minnesota State

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INDUSTRIAL HEALTH

Edited by the Committee on Industrial Health and Occupational Diseases

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THE PREVENTION OF HEAT SICKNESS

HEAT sickness can be prevented by a few simple rules of diet, proper living habits, and the replenishment of salt lost from the body through excessive perspiration. In most cases, the program of prevention of heat sickness ends with the use of sodium chloride tablets, plain or combined with sugar, which are provided to the workers in convenient dispensing containers. This is an essential part in its prophylaxis but the individuals who do their work in abnormally hot or humid environment as well as the entire population exposed to very hot weather must be educated to a twenty-four hour program of prevention of heat sickness.

Diet Important

First consider food. This should consist of an easily digested high carbohydrate, low fat diet with an adequate amount of beverage such as water, fresh fruit juices, milk, carbonated drinks, and possibly tea or coffee. Strong alcoholic drinks should never be used in hot weather. Beer and ale are permissible in small quantities. Frequent small drinks of beverages are safer than a large amount at one time which leaves the individual bloated and frequently causes nausea or vomiting on resumption of work. Ice cold drinks must be sipped slowly. Fried foods, canned or over-ripe corn, canned meats, or heavily spiced foods such as sausage are difficult to digest and predispose the hot weather worker to gastro-intestinal complaints. The large meal should come after returning home from work; a light, easily-digested but nourishing meal before work and at lunch.

Haste Should Be Eliminated

Living habits should provide some recreational facilities such as gardening, reading, fishing, or other light activity but must not encroach on the workman's seven to nine hours of sleep. A cool shower or tub bath before going to work and repeated on completion of work does much to minimize the effects of a hot job or warm weather. Sufficient time must be allowed for going to work to avoid running or undue excitement in getting there on time. Once on the job the worker should continue to be calm and should use the minimum effort compatible with efficient handling of his work. Avoid unnecessary running. Eliminate all non-productive motions.

Use of Salt

The use of salt tablets should be limited to 10 grains every two hours. Some men will tolerate more than that but the percentage of gastric upsets is high. More than 10 grains every two hours should rarely be necessary in the most extreme heat tolerated by man. The actual salt loss during working hours may exceed this amount but should be supplemented by the regular dietary intake. Added energy is sometimes provided through the addition of invert sugar to the tablet which also increases its palatability. Some individuals who do not tolerate the plain salt well can use the sugar and salt combination or an enteric-coated tablet. In the latter case sufficient time should be allowed from ingestion until the salt is needed by the body to permit the dissolution of the coating and absorption of the salt. Such tablets have been recovered in the stool with only part of the coating dissolved. This should be blamed to the type of coating used.

First Aid for Heat Shock

Men employed at glass or metal furnaces, in rolling mills, open pit mines or in similarly hot environment should be instructed in the recognition of heat shock and heat retention as shown with the use of a thermometer. Through the prompt first aid treatment before medical aid arrives the patient may avoid serious injury.

—L. S. ARLING, M.D.

Minnesota State Medical Association

ROSTER 1942

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Minnesota State Medical Association

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MINNESOTA STATE MEDICAL ASSOCIATION
COUNTY SOCIETY ROSTER

Key to Symbols: *Deceased; †Affiliate or Associate; ‡In Service

BLUE EARTH COUNTY MEDICAL SOCIETY

Regular meetings, last Monday of each month except June, July and August
Annual meeting in December
Number of Members: 38

President
Troost, H. B.....Mankato

Secretary
Liedloff, A. G.....Mankato

Andrews, R. N.....Mankato
Benham, E. W.....Mankato
Black, William.....Mankato
Butzer, J. A.....Mankato
Dahl, G. A.....Mankato
Denman, A. V.....Mankato
Edwards, R. T.....Elysian
Franchere, F. W.....Lake Crystal
Fugina, G. R.....Mankato
‡Gunlaugson, F. G.....Mankato
Haes, J. E.....Vernon Center
Hankerson, R. G.....Minnesota Lake
Hassett, R. G.....Mankato
Howard, M. I.....Mankato
Huffington, H. L.....Mankato
Jones, O. H.....Madison Lake
Juliar, R. O.....St. Clair
Kaufman, W. B.....Mankato
Kearney, R. W.....Mankato
Kemp, A. F.....Mankato
Koenigsberger, Charles .....Mankato
Liedloff, A. G.....Mankato
Lloyd, H. J.....Mankato
Luck, Hilda .....Mankato
Macbeth, J. L.....St. Clair
Mickelson, J. C.....Mankato
Miller, V. I.....Mankato
Morgan, H. O.....Amboy
Penn, G. E.....Mankato
‡Samuelson, L. G.....Mankato
Schlesselman, J. T.....Mankato
Schmidt, P. A.....Good Thunder
Sohmer, A. E.....Mankato
Stillwell, W. C.....Mankato
Troost, H. B.....Mankato
Vezina, J. C.....Mapleton
Wentworth, A. J.....Mankato
Williams, H. O.....Lake Crystal

BLUE EARTH VALLEY MEDICAL SOCIETY

Faribault and Martin Counties

Regular meetings, first Thursday of January, April, June and November
Annual meeting, first Thursday in November
Number of Members: 37

President
Heimark, J. J.....Fairmont

Secretary
Mills, J. L.....Winnebago

Bailey, H. B.....Fairmont
Bailey, R. B.....Fairmont
Barr, W. H.....Wells
Bergen, C. T.....Bricelyn
Blanchard, H. G.....Fairmont
Boysen, Herbert .....Madelia
Chambers, W. C.....Blue Earth
Cooper, M. D.....Winnebago
Demo, P. W.....Wells
Farrish, R. C.....Sherburn
Fisher, I. I.....Ceylon
Gardner, V. H.....Fairmont
Havel, T. E.....Blue Earth
Heimark, J. J.....Fairmont
Henderson, A. J.....Kiester
†Holm, P. F.....Wells
Hunt, R. C.....Fairmont
Hunt, R. S.....Fairmont
Hunte, A. F.....Globe, Ariz.
Johnson, D. W.....Fairmont
†Johnson, H. P.....Fairmont
Krause, C. W.....Fairmont
Luedtke, G. H.....Fairmont
MacMillan, D. G.....Triumph
McGroarty, J. J.....Easton
Mills, J. L.....Winnebago
Parsons, R. L.....Monterey
Raymond, J. H.....Canby
Rowe, W. H.....Fairmont
Russ, H. H.....Blue Earth
Sommer, A. W.....Elmore
‡Sybilrud, H. W.....Bricelyn
Thayer, E. A.....Truman
Vaughan, V. M.....Truman
Virnig, M. P.....Wells
Wilson, C. E.....Blue Earth
Zemke, E. E.....Fairmont

CAMP RELEASE DISTRICT MEDICAL SOCIETY

Chippewa, Lac Qui Parle and Yellow Medicine Counties

Regular meetings monthly
Annual meeting, February
Number of Members: 25

President
Hauge, M. I.....Clarkfield

Secretary
Boody, G. J., Jr.....Dawson

Bergh, L. N.....Montevideo
Boody, G. J., Jr.....Dawson
Burns, F. M.....Milan
Burns, M. A.....Milan
Foshager, H. T.....Clara City
Hauge, M. I.....Clarkfield
Holmberg, L. J.....Canby
Hudec, E. R.....Echo
Johnson, C. M.....Dawson
‡Johnson, V. M.....Dawson
Jordan, L. S.....Granite Falls
Kath, R. H.....Wood Lake
Kaufman, W. C.....Appleton
Lee, W. N.....Madison
Lima, Ludvig.....Montevideo
Minge, R. K.....Clarkfield
Nelson, M. S.....Granite Falls
Owens, W. A.....Montevideo
Pertl, A. L.....Canby
Roust, H. A.....Montevideo
Sanderson, A. G.....Granite Falls
Schmidt, P. G., Jr.....Granite Falls
Smith, L. G.....Montevideo
Westby, Magnus.....Madison
Westby, Nels.....Madison

CLAY-BECKER COUNTY MEDICAL SOCIETY

Regular meetings three times a year
Annual meeting, December
Number of Members: 23

President
Rice, H. G.....Moorhead

Secretary
Ingebrigtson, E. K. G.....Moorhead

†Aborn, W. H.....Hawley
Bottolfson, B. T.....Moorhead
Carman, J. E.....Detroit Lakes
Duncan, J. W.....Moorhead
Ellingson, A. R.....Detroit Lakes
Gosslee, G. L.....Moorhead
Hagen, O. J.....Moorhead
Haight, G. G.....Audubon
Hendrickson, R. R.....Lake Park
Humphrey, E. W.....Moorhead
Ingebrigtson, E. K. G.....Moorhead
Johnson, Olga H.....Moorhead
Larsen, O. O.....Detroit Lakes
Larson, Arnold.....Detroit Lakes
Moberg, C. W.....Detroit Lakes
Otto, H. C.....Frazee
‡Rice, H. G.....Moorhead
Rutledge, L. H.....Detroit Lakes
Seitz, S. B.....Barnesville
Simison, Carl.....Barnesville
Simison, C. W.....Hawley
Thysell, F. A.....Moorhead
Thysell, V. D.....Hawley

DAKOTA COUNTY MEDICAL SOCIETY

Number of Members: 12

President
L. S. Burns.....So. St. Paul

Secretary
A. H. Field.....Farmington

Burns, L. S.....So. St. Paul
Emond, A. J.....Farmington
Field, A. H.....Farmington
Heinz, Ivy B.....Hastings
Heinz, L. H.....Hastings
Sanford, J. A.....Farmington
Walter, G. F.....Farmington

EAST CENTRAL MINNESOTA MEDICAL SOCIETY

Anoka, Chisago, Isanti, Kanabec, Mille Lacs, Pine and Sherburne Counties
Regular meetings January, March, May, July, September and November
Annual meeting, November
Number of Members: 38

President
Roehlke, A. B.....Elk River

Secretary
Arends, A. L.....Cambridge

Arends, A. L.....Cambridge
Blomberg, W. R.....Princeton
Blumenthal, J. S.....Columbia Heights
Bossert, C. S.....Mora
Brink, D. M.....New York, N. Y.
Brownstone, Manuel.....Sandstone
Bunker, B. W.....Anoka
Callahan, F. F.....Pokegama

Cooney, H. C.....Princeton
†Dedolph, T. H.....Braham
Dredge, H. P.....Sandstone
Gardner, W. P.....Anoka
Gaviser, David.....Princeton
Gray, R. C.....Cambridge
Gully, R. J.....Cambridge
Halpin, J. E.....Rush City
Hedenstrom, L. H.....Cambridge
Holmes, A. E.....Rush City
Johnson, A. R.....Isanti
Kelsey, C. G.....Hinckley
McBroom, D. E.....St. Paul
Mork, A. H.....Anoka
Mork, F. E.....Anoka
Nordman, W. F.....Mora
Nygren, W. T.....Braham
Olson, L. M.....Chisago City
Patterson, H. D.....Anoka
Petersen, P. C.....Braham
Peterson, A. A.....Mora
Roehlke, A. B.....Elk River
Schlesselman, George.....Anoka
Spurzem, R. J.....Anoka
Stephan, E. L.....Hinckley
‡Stratte, A. K.....Pine City
Swensen, R. G.....North Branch
Tesch, G. H.....Elk River
Vik, Melvin.....Onamia
Whitney, R. A.....Cambridge

FREEBORN COUNTY MEDICAL SOCIETY

Regular meetings, Quarterly
Annual meeting, December
Number of Members: 24

President
Calhoun, F. W.....Albert Lea

Secretary
Palmerton, E. S.....Albert Lea

Barr, L. C.....Albert Lea
‡Branham, D. S.....Albert Lea
Butturff, C. R.....Freeborn
Calhoun, F. W.....Albert Lea
Donovan, D. L.....Albert Lea
Folken, F. G.....Albert Lea
Freeman, J. P.....Albert Lea
Freligh, W. P.....Albert Lea
Gamble, J. W.....Albert Lea
Gamble, P. M.....Albert Lea
Gullixson, A.....Albert Lea
Kaasa, L. J.....Albert Lea
Kamp, B. A.....Albert Lea
Leopard, B. A.....Albert Lea
Neel, H. B.....Albert Lea
Nesheim, M. O.....Emmons
Palmer, C. F.....Albert Lea
Palmer, W. L.....Albert Lea
Palmerton, E. S.....Albert Lea
Person, J. P.....Alden
Prins, L. R.....Albert Lea
Schultz, J. A.....Albert Lea
Swanson, R. R.....Albert Lea
Whitson, S. A.....Albert Lea

GOODHUE COUNTY MEDICAL SOCIETY

Regular meetings, none
Annual meeting, December
Number of Members: 22

President
Steffens, L. A.....Red Wing

Secretary
Brusegard, J. F.....Red Wing

Aanes, A. M.....Red Wing
Anderson, S. H.....Red Wing
Baldigo, E. M.....Red Wing
Brusegard, J. F.....Red Wing
*Claydon, D. R.....Red Wing
Claydon, L. E.....Red Wing
Flom, M. G.....Zumbrota
Graves, R. B.....Red Wing
Hartnagel, G. F.....Red Wing
Hedin, R. F.....Red Wing
Johnson, A. E.....Red Wing
‡Johnson, M. R.....Red Wing
Jones, A. W.....Red Wing
Juers, E. H.....Red Wing
Kimmel, G. C.....Red Wing
Liffrig, W. W.....Goodhue
‡Mack, J. J.....St. Louis, Mo.
McGuigan, H. T.....Red Wing
Sherman, R. V.....Red Wing
Smith, M. W.....Red Wing
Steffens, L. A.....Red Wing
Vaaler, T.....Cannon Falls
Williams, M. R.....Cannon Falls

HENNEPIN COUNTY MEDICAL SOCIETY

Regular meetings, first Monday each month, October through May
Annual meeting, October
Number of Members: 663

President
Huenekens, E. J.....Minneapolis

Secretary
Jones, W. R.....Minneapolis

Executive Secretary
Mr. J. H. Baker.....Minneapolis

Aagaard, G. N., Jr.....Minneapolis
Abramson, Milton.....Minneapolis
Adams, J. M.....Minneapolis
Alexander, H. A.....Minneapolis
Aling, C. A.....Minneapolis
Aling, C. P.....Minneapolis
Allen, H. W.....Minneapolis
Allison, R. G.....Minneapolis
Altnow, H. O.....Minneapolis
Andersen, A. G.....Minneapolis
Andersen, S. C.....Minneapolis
Anderson, D. D.....Minneapolis
‡Anderson, E. D.....Minneapolis
Anderson, E. R.....Minneapolis
Anderson, F. J.....Minneapolis
Anderson, J. K.....Minneapolis
Anderson, K. W.....Minneapolis
Anderson, P. A.....Minneapolis
Anderson, U. S.....Minneapolis
‡Andreassen, E. C.....Minneapolis
Andresen, K. D.....Minneapolis
Andrews, R. S.....Minneapolis
Andrus, F. C.....Minneapolis
Annis, H. B.....Minneapolis
Arey, S. L.....Excelsior
Arlander, C. E.....Minneapolis
Arling, L. S.....Minneapolis
Arnold, Anna W.....Minneapolis
Arnold, D. C.....Minneapolis
Arvidson, C. G.....Minneapolis
Aune, Martin.....Minneapolis
Aurand, W. H.....Minneapolis
Baken, M. P.....Minneapolis
Baker, A. B.....Minneapolis
Baker, A. T.....Minneapolis
Baker, E. L.....Minneapolis
Baker, Looe.....Minneapolis
‡Balkin, S. G.....Minneapolis
†Barber, J. P.....Minneapolis
‡Barr, R. N.....St. Paul
Barron, Moses.....Minneapolis
Bass, G. W.....Minneapolis
Baxter, S. H.....Minneapolis
Bayard, H. F.....Minneapolis
†Beard, A. H.....Minneapolis
Beckman, W. G.....Minneapolis
Bedford, E. W.....Minneapolis
†Bell, E. T.....Minneapolis
‡Belzer, M. S.....Minneapolis
Benesh, L. A.....Minneapolis
Benesh, N. G.....Minneapolis
Benjamin, A. E.....Minneapolis
‡Benjamin, E. G.....Minneapolis
‡Benjamin, H. G.....Minneapolis
Benn, F. G.....Minneapolis
Berger, A. G.....Minneapolis
‡Bergh, G. S.....Minneapolis
Berkwitz, N. J.....Minneapolis
‡Berman, Reuben .....Minneapolis
Bessesen, A. N., Jr.....Minneapolis
Bessesen, D. H.....Minneapolis
Bessesen, W. A.....Minneapolis
Blake, James.....Hopkins
Blake, J. A.....Hopkins
Blumstein, Alex.....Minneapolis
Bockman, M. W. H.....Minneapolis
Boehme, E. J.....Minneapolis
Boehrer, J. J.....Minneapolis
Boies, L. R.....Minneapolis
Booth, A. E.....Minneapolis
Boreen, C. A.....Minneapolis
Borgeson, E. J.....Minneapolis
Borman, C. N.....Minneapolis
†Bouman, H. A. H.....Minneapolis
Boynton, Ruth E.....Minneapolis
Bratrud, A. F.....Minneapolis
Brekke, H. J.....Minneapolis
†Brown, E. D.....Paynesville
Brutsch, G. C.....Minneapolis
Bryant, F. L.....Minneapolis
‡Buchstein, H. F.....Minneapolis
Bulkley, Kenneth.....Minneapolis
Burlingame, D. A.....Minneapolis
Butler, John.....Minneapolis
Buzzelle, L. K.....Minneapolis
Cable, M. L.....Minneapolis
Cabot, V. S.....Minneapolis
Cady, L. H.....Minneapolis
Callerstrom, G. W.....Minneapolis
Cameron, Isabell L.....Minneapolis
Camp, W. E.....Minneapolis
Campbell, O. J.....Minneapolis
Cardle, A. E.....Minneapolis
Carey, J. B.....Minneapolis
Carlson, Lawrence.....Minneapolis
Carlson, L. T.....Minneapolis
Caron, R. P.....Minneapolis
‡Caspers, C. G.....Minneapolis
‡Cavanor, F. T.....Minneapolis
‡Challman, S. A.....Minneapolis
Chesley, A. J.....Minneapolis
Christenson, G. R.....Minneapolis
Christianson, H. W.....Minneapolis
†Clark, H. S.....Minneapolis
Clay, L. B.....Minneapolis
Cochrane, R. F.....Minneapolis
Cohen, S. S.....Oak Terrace
Colp, E. A.....Robbinsdale
Condit, W. H.....Minneapolis
Cooperman, H. O.....Minneapolis
Corbett, J. F.....Minneapolis
Corniea, A. D.....Minneapolis
Cranmer, R. R.....Minneapolis
Cranston, R. W.....Minneapolis
Creevy, C. D.....Minneapolis
‡Creighton, R. H.....Minneapolis
Cumming, H. A.....Minneapolis
Curtin, J. F.....Minneapolis
Cutts, George.....Minneapolis
Dady, E. E.....Minneapolis
Dahl, E. O.....Minneapolis
Dahl, J. A.....Minneapolis
Daniel, D. H.....Minneapolis
Daniel, L. M.....Minneapolis
Davis, J. C.....Minneapolis
del Plaine, C. W.....Minneapolis
Devereaux, T. J.....Wayzata
Diehl, H. S.....Minneapolis
Diessner, H. D.....Minneapolis
Dippel, A. L.....Minneapolis
*Doering, R. E.....Minneapolis
Dorge, R. I.....Minneapolis
Dornblaser, H. B.....Minneapolis
Dorsey, G. C.....Minneapolis
Dowidat, R. W.....Minneapolis
Doxey, G. L.....Minneapolis
Doyle, L. O.....Minneapolis
Drake, C. R.....Minneapolis
Drill, H. E.....Hopkins
Duff, E. R.....Minneapolis
Dukelow, D. A.....Minneapolis
Dumas, A. G.....Minneapolis
Dunlap, E. H.....Minneapolis
Dunn, G. R.....Minneapolis
Duryea, W. M.....Minneapolis
†Dutton, C. E.....Minneapolis
Dvorak, B. A.....Minneapolis
Dwan, P. F.....Minneapolis

Dworsky, S. D.....Minneapolis

Ehrenberg, C. J.....Minneapolis
Ehrlich, S. P.....Minneapolis
Eich, Matthew.....Minneapolis
Eisenstadt, D. H.....Minneapolis
Eisenstadt, W. S.....Minneapolis
Eitel, G. D.....Minneapolis
Ellison, D. E.....Minneapolis
Engelhart, P. C.....Minneapolis
Engstrand, O. J.....Minneapolis
‡Erickson, R. F.....Minneapolis
Ericson, R. M.....Minneapolis
‡Evans, E. T.....Minneapolis
Evans, R. D.....Minneapolis

Fahr, G. E.....Minneapolis
Fansler, W. A.....Minneapolis
‡Farsht, I. J.....Minneapolis
Feeney, J. M.....Minneapolis
Fenger, E. P. K.....Oak Terrace
Fetterly, Warren.....Minneapolis
Fink, L. W.....Minneapolis
Fink, W. H.....Minneapolis
†Fitzgerald, D. F.....Minneapolis
Fjeldstad, C. A.....Minneapolis
Fleming, A. S.....Minneapolis
Foker, L. W.....Minneapolis
Ford, W. H.....Minneapolis
Foster, W. K.....Minneapolis
‡Fowler, L. H.....Minneapolis
Frane, D. B.....Minneapolis
Fredericks, G. M.....Minneapolis
Friedell, Aaron.....Minneapolis
‡Fritzell, K. E.....Minneapolis
Frost, J. B.....Minneapolis
Fuller, Alice H.....Minneapolis
‡Funk, V. K.....Oak Terrace

‡Galloway, J. B.....Minneapolis
Gammell, J. H.....Minneapolis
Gardner, E. L.....Minneapolis
Garten, J. L.....Minneapolis
*Giere, E. O.....Minneapolis
Giere, J. C.....Minneapolis
Giere, R. W.....Minneapolis
†Giessler, P. W.....Minneapolis
Gilbert, M. G.....Minneapolis
Gilles, F. L.....Minneapolis
Gingold, B. A.....Minneapolis
Girvin, R. B.....Minneapolis
Golberg, M. L.....Minneapolis
Goldberg, I. M.....Minneapolis
Goldman, T. I.....Minneapolis
‡Goldner, M. Z.....Minneapolis
Good, H. D.....Minneapolis
Gordon, P. E.....Minneapolis
†Gratzek, F. R.....Minneapolis
Grave, Floyd.....Minneapolis
Green, R. G.....Minneapolis
Grimes, Marian.....Minneapolis
Gronvall, P. R.....Minneapolis
Gunderson, N. A.....Minneapolis
Gushurst, E. G.....Minneapolis
Gustason, H. T.....Minneapolis

†Hacking, F. H.....Minneapolis
‡Hagen, W. S.....Minneapolis
†Haggard, G. D.....Minneapolis
Hall, J. M.....Minneapolis
Hallberg, C. A.....Minneapolis
‡Hallock, Philip.....Minneapolis
Hamel, A. L.....Minneapolis
Hamlin, G. B.....Minneapolis
‡Hammerstad, L. M.....Minneapolis
Hammond, A. J.....Minneapolis
Hannah, H. B.....Minneapolis
Hansen, C. O.....Minneapolis
Hansen, E. W.....Minneapolis
Hansen, Olga S.....Minneapolis
Hanson, H. J.....Minneapolis
Hanson, H. V.....Minneapolis
Hanson, M. B.....Minneapolis
Hanson, W. A.....Minneapolis
Happe, L. J.....Minneapolis
Harrington, C. D.....Wayzata
Harrington, F. E.....Minneapolis
‡Hart, V. L.....Minneapolis
†Hartzell, T. B.....Minneapolis
Hastings, D. R.....Minneapolis
‡Hauge, E. T.....Minneapolis
Haugen, J. A.....Minneapolis
Haven, W. K.....Minneapolis
†Haverfield, Addie R.....Minneapolis
‡Hawkinson, R. P.....Minneapolis
Hayes, J. M.....Minneapolis
Hays, A. T.....Minneapolis
‡Head, D. P.....Minneapolis
Head, G. D.....Minneapolis
Hedback, A. E.....Minneapolis
Heim, R. R.....Minneapolis
Hendrickson, J. F.....Minneapolis
Henrikson, E. C.....Minneapolis
†Henry, C. E.....Kirksville, Mo.
Henry, M. O.....Minneapolis
Herbert, W. L.....Minneapolis
‡Herbolsheimer, A. J.....Minneapolis
*Herman, A. L.....Minneapolis
Higgins, G. K.....Oak Terrace
Higgins, J. H.....Minneapolis
Hill, Eleanor J.....Minneapolis
Hillis, S. J.....Minneapolis
Hinckley, R. G.....Minneapolis
†Hirschfelder, A. D.....Minneapolis
Hirshfield, F. R.....Minneapolis
Hoaglund, A. W.....Minneapolis
†Hobbs, C. A.....Minneapolis
Hodge, S. V.....Minneapolis
Hoffbauer, F. W.....Minneapolis
Hoffert, H. E.....Minneapolis
Hoffman, R. A.....Minneapolis
Hoffman, W. L.....Minneapolis
†Holl, P. M.....Minneapolis
‡Holmberg, C. J.....Minneapolis
Holt, W. B.....Minneapolis
Holzapfel, F. C.....Minneapolis
Houkom, Bjarne.....Minneapolis
Hovland, M. L.....Minneapolis
Hudson, G. E.....Minneapolis
Huenekens, E. J.....Minneapolis
Hultkrans, J. C.....Minneapolis
Hultkrans, R. E.....Minneapolis
Hurd, Annah.....Minneapolis
‡Hutchinson, C. J.....Minneapolis
Hymes, Charles.....Minneapolis
Hynes, J. E.....Minneapolis

Irvine, H. G.....Minneapolis

†Jackson, C. M.....Minneapolis
‡Jaeck, J. L.....Minneapolis
Jennings, Mary H.....Minneapolis
Jensen, Harry.....Minneapolis
Jensen, M. J.....Minneapolis
Jensen, R. A.....Minneapolis
Johnson, A. B.....Minneapolis
Johnson, A. E.....Minneapolis
Johnson, Evelyn V...St. Louis Park
Johnson, E. W.....Minneapolis
Johnson, H. A.....Minneapolis
Johnson, J. A.....Minneapolis
Johnson, Julius.....Minneapolis
†Johnson, N. A...Santa Monica, Calif.
Johnson, Norman.....Minneapolis
Johnson, N. T.....Minneapolis
Johnson, R. A.....Minneapolis
‡Johnson, R. E.....Minneapolis
‡Johnson, Y. T.....Minneapolis
‡Jones, H. W., Jr.....Minneapolis
Jones, W. R.....Minneapolis
Josewich, Alexander.....Minneapolis
Judd, W. H.....Minneapolis
Jurdy, M. J.....Minneapolis

Kalin, O. T.....Minneapolis
Karlstrom, A. E.....Minneapolis
Kelby, G. M.....Minneapolis
Kennedy, C. C.....Minneapolis
Kennedy, Jane F.....Minneapolis
Kerkhof, A. C.....Minneapolis
Kertesz, G.....Minneapolis
Kibbe, O. A.....Minneapolis
†King, E. A.....Minneapolis
King, Frances W.....Oak Terrace
King, H. T.....Minneapolis
Kinsella, T. J.....Minneapolis
Kistler, A. J.....Minneapolis
Kistler, C. M.....Minneapolis
Knapp, M. E.....Minneapolis
Knight, R. R.....Minneapolis
Knight, R. T.....Minneapolis
Koepcke, G. M.....Minneapolis
Koller, H. M.....Minneapolis
Koller, L. R.....Minneapolis
Korchik, J. P.....Minneapolis
Koucky, R. W.....Minneapolis
Kucera, F. J.....Hopkins
Kucera, W. J.....Minneapolis

Lajoie, J. M.....Minneapolis
Lang, L. A.....Minneapolis
Lapierre, A. P.....Minneapolis
Lapierre, J. T.....Minneapolis
Larsen, F. W.....Minneapolis
Larson, C. M.....Minneapolis
‡Larson, Lawrence M.....Minneapolis
Larson, Leonard M.....Oak Terrace
Larson, P. N.....Minneapolis
La Vake, R. T.....Minneapolis
Laymon, C. W.....Minneapolis
Lazar, H. L.....Minneapolis
†Leavitt, H. H.....Minneapolis
Lebowske, J. A.....Minneapolis
Lee, H. M.....Minneapolis
Leland, H. R.....Minneapolis
‡Leland, J. A. C.....Minneapolis
Lenz, O. A.....Minneapolis
Leonard, L. J.....Minneapolis
Leonard, Sam.....Minneapolis
Lillehei, E. J.....Robbinsdale
Lind, C. J.....Minneapolis
Lindberg, A. C.....Minneapolis
Lindberg, V. L.....Minneapolis
‡Lindgren, R. C.....Minneapolis
Lindquist, R. H.....Minneapolis
Linner, H. P.....Minneapolis
†Linton, W. B.....Minneapolis
Lippman, E. S.....Minneapolis
‡Lipschultz, Oscar.....Minneapolis
Litchfield, J. T.....Minneapolis
Litman, A. B.....Minneapolis
Litzenberg, J. C.....Minneapolis
Logefeil, R. C.....Minneapolis
†Long, Jesse.....Minneapolis
Loomis, E. A.....Minneapolis
Lovett, Beatrice R.....Oak Terrace
Lowry, Elizabeth C.....Minneapolis
Lowry, Thomas.....Minneapolis
‡Lufkin, N. H.....Minneapolis
Lundblad, R. A.....Minneapolis
‡Lundblad, S. W.....Minneapolis
Lundgren, A. C.....Minneapolis
Lundquist, E. F.....Minneapolis
Lynch, M. J.....Minneapolis
Lysne, Henry.....Minneapolis
Lysne, Myron.....Minneapolis

MacDonald, A. E.....Minneapolis
MacDonald, D. A.....Minneapolis
Mach, F. B.....Minneapolis
MacKinnon, D. C.....Minneapolis
Macnie, J. S.....Minneapolis
Maeder, E. C.....Minneapolis
Maland, C. O.....Minneapolis
Mariette, E. S.....Oak Terrace
Mark, D. B.....Minneapolis
Marking, G. H.....Osseo
Martinson, C. J.....Wayzata
†Matchan, G. R.....Minneapolis
Matthews, Justus.....Minneapolis
Mattill, P. M.....Oak Terrace
Mattison, R. E.....Minot, N. D.
Mattson, Hamlin.....Minneapolis
Maxeiner, S. R.....Minneapolis
May, W. H.....Minneapolis
‡McCarthy, Donald.....Minneapolis
McCartney, J. S.....Minneapolis
‡McCrimmon, H. P.....Minneapolis
McDaniel, Orianna.....Minneapolis
McFarland, A. H.....Minneapolis
McGandy, R. F.....Minneapolis
McGeary, G. E.....Minneapolis
McInerny, M. W.....Minneapolis
*McIntyre, George...San Marino, Calif.
McKelvey, J. L.....Minneapolis
McKenzie, C. H.....Minneapolis
McKinlay, C. A.....Minneapolis
McKinley, J. C.....Minneapolis
McKinney, F. S.....Minneapolis
McLennan, C. E.....Minneapolis
McPheeters, H. O.....Minneapolis
†McQuarrie, Irvine.....Minneapolis
Meland, E. L.....Minneapolis
Merkert, C. E.....Minneapolis
Merkert, G. L.....Minneapolis
†Merrill, Elisabeth.....Minneapolis
Meyer, E. L.....Minneapolis
Michael, J. C.....Minneapolis
Michel, H. H.....Minneapolis
Michelson, H. E.....Minneapolis
Miller, H. E.....Minneapolis
‡Miller, Hugo E.....Minneapolis
Miller, J. C.....Minneapolis
Milton, J. S.....Minneapolis
Minsky, A. A.....Minneapolis
Mitchell, E. C.....Mound
Moe, J. H.....Minneapolis
Moen, J. K.....Minneapolis
*Moir, W. W.....Minneapolis
Monson, E. M.....Minneapolis
Moren, Edward.....Minneapolis
Moriarty, Cecile R.....St. Paul
Morrison, A. W.....Minneapolis
Morrison, Charlotte J.....Minneapolis
Morse, R. W.....Minneapolis
Murphy, E. P.....Minneapolis
Murphy, I. J.....Minneapolis
Myers, J. A.....Minneapolis

‡Naslund, A. W.....Minneapolis
Neal, J. M.....Minneapolis
Neary, R. P.....Minneapolis
†Nelson, H. S.....Excelsior
Nelson, E. N.....Minneapolis
Nelson, Harvey.....Minneapolis
Nelson, M. C.....Minneapolis
Nelson, O. L. N.....Minneapolis
Nelson, W. I.....Minneapolis
Newhart, Horace.....Minneapolis
‡Noonan, W. J.....Minneapolis
Nordin, G. T.....Minneapolis
Nordland, Martin.....Minneapolis
Noth, H. W.....Minneapolis

Nydahl, M. J.....St. Paul
Nylander, E. G.....Minneapolis

Oberg, C. M.....Minneapolis
†O'Brien, W. A.....Minneapolis
O'Donnell, J. E.....Minneapolis
Olsen, E. G.....Minneapolis
Olson, A. C.....Minneapolis
Olson, F. A.....Minneapolis
Olson, O. A.....Minneapolis
Olson, R. G.....Minneapolis
Oppen, E. G.....Minneapolis
Owre, Oscar.....Minneapolis

‡Paine, J. R.....Minneapolis
Palen, B. J.....Minneapolis
Patterson, W. E.....Minneapolis
†Pederson, R. M.....Minneapolis
*Pennington, Reuben.....Minneapolis
Peppard, T. A.....Minneapolis
‡Perlman, E. C.....Minneapolis
Petersen, J. R.....Minneapolis
Petersen, Thorvald.....Minneapolis
Peterson, Henry.....Minneapolis
Peterson, H. W.....Minneapolis
Peterson, N. P.....Minneapolis
Peterson, O. H.....Minneapolis
Peterson, P. E.....Minneapolis
Peterson, W. C.....Minneapolis
Petit, L. J.....Minneapolis
Pewters, J. T.....Minneapolis
Peyton, W. T.....Minneapolis
Pfunder, M. C.....Minneapolis
Phelps, K. A.....Minneapolis
Platou, E. S.....Minneapolis
Platou, R. V.....Minneapolis
Pohl, J. F.....Minneapolis
Pollard, D. W.....Minneapolis
Pollock, D. K.....Minneapolis
Polzak, J. A.....Minneapolis
Poppe, F. H.....Minneapolis
Potter, R. B.....Minneapolis
Potthoff, C. J.....Minneapolis
Pratt, F. J.....Minneapolis
*Pratt, J. A.....Minneapolis
Preine, I. A.....Minneapolis
Preston, P. J.....Minneapolis
Priest, R. E.....Minneapolis
Prim, J. A.....Minneapolis
‡Proffitt, W. E.....Minneapolis
Proshek, C. E.....Minneapolis

‡Quello, R. O. B.....Minneapolis
†Quinby, T. F.....Minneapolis
Quist, H. W.....Minneapolis

Reed, C. A.....Minneapolis
Regnier, E. A.....Minneapolis
Rewbridge, A. G.....Minneapolis
Reynolds, J. S.....Minneapolis
Rice, C. O.....Minneapolis
‡Richardson, F. S...Fort Meade, S. D.
Richdorf, L. F.....Minneapolis
Rieke, W. W.....Wayzata
Rigler, L. G.....Minneapolis
Risch, R. E.....Minneapolis
Rizer, R. I.....Minneapolis
Roan, C. M.....Minneapolis
Robb, E. F.....Minneapolis
Robbins, O. F.....Minneapolis
Roberts, L. J.....Minneapolis
Roberts, S. W.....Minneapolis
Roberts, T. S.....Minneapolis
Roberts, W. B.....Minneapolis
Robitshek, E. C.....Minneapolis
Rochford, W. E.....Minneapolis
Rodda, F. C.....Minneapolis
Rosen, Samuel.....Minneapolis
Rosenwald, R. M.....Minneapolis
Roskilly, G. C. P.....Minneapolis
Ross, A. J.....Minneapolis
Rucker, W. H.....Minneapolis
Rudell, G. L.....Minneapolis
Russeth, A. N.....Minneapolis
Rusten, E. M.....Minneapolis

‡Sadler, W. P.....Minneapolis
St. Cyr, K. J.....Osseo
Saliterman, B. I.....Minneapolis
Salt, C. G.....Minneapolis
Samuelson, Samuel.....Minneapolis
Sandell, S. T.....Oak Terrace
‡Sandt, K. E.....Minneapolis
Sawatzky, W. A.....Minneapolis
Schaaf, F. H. K.....Minneapolis
Schaefer, W. G.....Minneapolis
†Scheldrup, N. H.....Minneapolis
Scherer, L. R.....Minneapolis
Schiele, B. C.....Minneapolis
‡Schmidt, G. F.....Minneapolis
†Schmitt, A. F.....Minneapolis
†Schmitt, S. C.....Los Angeles, Calif.
†Schneider, J. P.....Minneapolis
Schneidman, N. R.....Minneapolis
Schottler, M. E.....Minneapolis
Schultz, P. J.....Minneapolis
†Schussler, O. F.....Minneapolis
Schwartz, V. J.....Minneapolis
†Schwyzer, Gustav.....Minneapolis
†Scott, F. H.....Minneapolis
Scott, H. G.....Minneapolis
Seashore, Gilbert.....Minneapolis
Seham, Max.....Minneapolis
Seifert, M. H.....Excelsior
Seljeskog, S. R.....Minneapolis
*Selleseth, I. F.....Minneapolis
Sessions, J. C.....Minneapolis
Shaperman, Eva P.....Minneapolis
Shapiro, M. J.....Minneapolis
Sharp, D. V.....Minneapolis
Siegmann, W. C.....Minneapolis
Silver, J. D.....Minneapolis
Simons, J. H.....Minneapolis
Simonson, D. B.....Minneapolis
Simpson, E. D.....Minneapolis
Sinykin, M. B.....Minneapolis
Siperstein, D. M.....Minneapolis
†Sivertsen, Andrew.....Excelsior
Sivertsen, Ivar.....Minneapolis
Skjold, A. C.....Minneapolis
Sloan, Julius.....Minneapolis
Smisek, F. M.....Minneapolis
Smith, A. E.....Minneapolis
Smith, A. M.....Minneapolis
Smith, Archie M.....Minneapolis
Smith, H. R.....Minneapolis
Smith, Margaret I.....Minneapolis
Smith, N. M.....Minneapolis
Soderlind, R. T.....Minneapolis
Solhaug, S. B.....Minneapolis
Spano, J. P.....Minneapolis
Sperling, Louis.....Minneapolis
Spink, W. W.....Minneapolis
Spratt, C. N.....Minneapolis
Stanford, C. E.....Minneapolis
Stebbins, T. L.....Minneapolis
Stein, K. E.....Lakeville
Stelter, L. A.....Minneapolis
Stenstrom, Annette T.....Minneapolis
Stewart, R. I.....Minneapolis
Stoesser, A. V.....Minneapolis
†Stomel, Joseph...Los Angeles, Calif.
Strachauer, A. C.....Minneapolis
‡Stromgren, D. T.....Minneapolis
Strout, G. E.....Minneapolis
Sturre, J. R.....Minneapolis
Sullivan, R. M.....Minneapolis
Sundt, Mathias.....Minneapolis
Swanson, Cephas.....Minneapolis
Swanson, R. E.....Minneapolis
‡Sweetser, H. B., Jr.....Minneapolis
†Sweetser, H. B., Sr.....Minneapolis
Sweetser, T. H.....Minneapolis
Sweitzer, S. E.....Minneapolis
†Swendseen, C. G.....Minneapolis

Taylor, J. H.....Minneapolis
Thomas, G. E.....Minneapolis
Thomas, G. H.....Minneapolis
Thomas, G. J.....Minneapolis
Thompson, W. H.....Minneapolis
Thysell, D. M.....Minneapolis
Tingdale, A. C.....Minneapolis
Trueman, H. S.....Minneapolis
Tunstead, H. J.....Minneapolis
Turnacliff, D. D.....Minneapolis

Ude, W. H.....Minneapolis
Ulrich, H. L.....Minneapolis
Undine, C. A.....Minneapolis

Vik, A. E.....Minneapolis

Wahlquist, H. F.....Minneapolis
Walch, A. E.....Minneapolis
Waldron, C. W.....Minneapolis
Wall, C. R.....Minneapolis
Walsh, W. T.....Minneapolis
Wangensteen, O. H.....Minneapolis
Wanous, E. Z.....Minneapolis
†Ward, A. W.....Minneapolis
Ward, P. A.....Minneapolis
Watson, C. J.....Minneapolis
Webb, R. C.....Minneapolis
‡Weisman, S. A.....Minneapolis
West, Catherine C.....Minneapolis
Wethall, A. G.....Minneapolis
Wetherby, Macnider.....Minneapolis
Weum, T. W.....Minneapolis
White, A. A.....Minneapolis
White, S. M.....Minneapolis
White, W. D.....Minneapolis
Whitesell, L. A.....Minneapolis
Widen, W. F.....Minneapolis
Wilcox, A. E.....Minneapolis
‡Wildebush, F. F.....Minneapolis
Wilder, K. W.....Minneapolis
Wilder, R. L.....Minneapolis
Wilken, P. A.....Minneapolis
Willcutt, C. E.....Minneapolis
Williams, Robert.....Minneapolis
Winer, L. H.....Minneapolis
Winther, Nora M. C.....Minneapolis
‡Wipperman, F. F.....Minneapolis
Witham, C. A.....Minneapolis
Wittich, F. W.....Minneapolis
Wohlrabe, A. A.....Minneapolis
Woodworth, Elizabeth.....Minneapolis
†Wright, C. D.....Minneapolis
Wright, S. G.....Minneapolis
Wright, W. S.....Minneapolis
Wyatt, O. S.....Minneapolis
Wynne, H. M. N.....Minneapolis

Ylvisaker, R. S.....Minneapolis
Yoerg, O. W.....Minneapolis

Zaworski, E. A.....Minneapolis
Zierold, A. A.....Minneapolis
Zinter, F. A.....Minneapolis
Ziskin, Thomas.....Minneapolis

KANDIYOHI-SWIFT-MEEKER COUNTY MEDICAL SOCIETY

Regular meetings, second Wednesday of month
Annual meeting, December
Number of Members: 34

President
Wilmot, H. E.....Litchfield
Secretary
Frost, E. H.....Willmar

Anderson, R. E.....Willmar
Arnson, J. M.....Benson
‡Beckjord, P. R.....Willmar
Branton, A. F.....Willmar
Branton, B. J.....Willmar
Brigham, Frank.....Watkins
Daignault, Oscar.....Benson
Danielson, K. A.....Litchfield
Danielson, Lennox.....Litchfield
Dowswell, W. J.....Kerkhoven
Feinstein, J. Y.....Grove City
Frederickson, Alice C.....Willmar
Frederickson, G. U. Y.....Willmar
Frisch, F. P.....Willmar
Frost, E. H.....Willmar
Giere, S. W.....Benson
‡Gilman, L. C.....Atwater
Hodapp, R. J.....Willmar
Jacobs, D. L.....Willmar
Jacobs, J. C.....Willmar
Johnson, Hans.....Kerkhoven
‡Johnson, J. W.....Kerkhoven
Kaufman, E. J.....Appleton
Macklin, W. E.....Litchfield
‡Mattson, A. D.....Atwater
Petersen, M. C.....Willmar
Proeschel, R. K.....Willmar
Ripple, R. J.....Willmar
Scofield, C. L.....Benson
Sellers, G. K.....Dassel
Solsem, F. N.....Spicer
Telford, V. J.....Litchfield
Wilmot, C. A.....Litchfield
Wilmot, H. E.....Litchfield

LYON-LINCOLN COUNTY MEDICAL SOCIETY

Regular meetings, first Tuesday of month
Annual meeting, Last Tuesday in October
Number of Members: 25

President
Frank, J. E.....Marshall
Secretary
Workman, W. G.....Tracy

Bossingham, O. N.....Lake Benton
‡Erickson, A. O.....Ivanhoe
Ford, B. C.....Marshall
Frank, J. E.....Marshall
Friedell, George.....Ivanhoe
Germo, Charles.....Balaton
Gray, F. D.....Marshall
Gray, R. F.....Marshall
‡Helferty, J. K.....Tracy
Hermanson, P. E.....Hendricks

Hoidale, A. D.....Tracy
Johnson, P. C.....Tyler
Karleen, C. I.....Tracy
Kruezer, T. C.....Marshall
Monson, L. J.....Canby

Purves, G. H.....Lake Benton
†Robertson, J. B.....Minneapolis
Sanderson, E. T.....Minneota
‡Smith, L. A.....Balaton
Thompson, C. O.....Hendricks

Vadheim, A. L.....Tyler
Valentine, W. H.....Tracy
Wolstan, S. D.....Minneota
Workman, W. G.....Tracy
Yaeger, W. W.....Marshall

McLEOD COUNTY MEDICAL SOCIETY

Regular meetings, at call of President
Annual meeting, January
Number of Members: 19

President
McMahon, M. J.....Green Isle
Secretary
Kallestad, L. L.....Hutchinson

Clement, J. B.....Lester Prairie
Goss, H. C.....Glencoe
Holm, H. H.....Glencoe

Jensen, A. M.....Brownton
Kallestad, L. L.....Hutchinson
Klima, W. W.....Stewart
Lippmann, E. W.....Hutchinson
McMahon, M. J.....Green Isle
Neumaier, Arthur .....Glencoe
Ninneman, N. N.....Silver Lake
Rempel, D. D.....Lester Prairie

Sahr, W. G.....Hutchinson
Schmidt, W. R.....Glencoe
Scholpp, O. W.....Hutchinson
Sheppard, C. G.....Hutchinson
†Sheppard, Fred .....Burien, Wash.
†Sheppard, P. E.....Hutchinson
†Tinker, C. W.....Stewart
Trutna, T. J.....Silver Lake

MOWER COUNTY MEDICAL SOCIETY

Regular meetings, last Thursday of each month
Annual meeting, November
Number of Members: 27

President
Havens, J. G. W.....Austin
Secretary
Leck, P. C.....Austin

Allen, C. C.....Austin
Allen, H. B.....Austin
Anderson, D. P., Jr.....Austin
Cronwell, B. J.....Austin
Eckdale, J. E.....Lyle
Eckhardt, C. L.....Austin
Fisch, H. M.....Austin

Flanagan, L. G.....Austin
Grise, W. B.....Austin
Havens, J. G. W.....Austin
Hegge, O. H.....Austin
Hegge, R. S.....Austin
Henslin, A. E.....Le Roy
Hertel, G. E.....Austin
Leck, P. C.....Austin
Lommen, P. A.....Austin
McKenna, J. K.....Austin

Melzer, G. R.....Lyle
Mitchell, R. S.....Grand Meadow
Morrow, J. J.....Austin
Morse, M. P.....Le Roy
Robertson, P. A.....Austin
Rosenthal, F. H.....Grand Meadow
Schneider, P. J.....Adams
Schottler, G. J.....Dexter
Sheedy, C. L.....Austin
Thomson, J. M.....Chicago, Ill.

NICOLLET-LE SUEUR COUNTY MEDICAL SOCIETY

Annual meeting, December
Number of Members: 24

President
Nilson, H. J.....North Mankato
Secretary
Johnson, H. C.....North Mankato

Aitkens, H. B.....Le Center
Covell, W. W.....St. Peter
Curtis, R. A.....Le Center
Ericson, Swan.....Le Sueur
Freeman, G. H.....St. Peter

‡Grimes, B. P.....St. Peter
Hiniker, P. J.....Le Sueur
Holtan, Theodore.....Waterville
Johnson, H. C.....North Mankato
Kolars, J. J.....Le Center
Larson, M. H.....Nicollet
Lenander, M. E.....St. Peter
Miller, E. W.....St. Peter
Nilson, H. J.....North Mankato

Olmanson, E. G.....St. Peter
Olson, D. C.....Gaylord
Rossen, R. X.....Hastings
Sonnesyn, N. N.....Le Sueur
Strathern, C. S.....St. Peter
Strathern, F. P.....St. Peter
Traxler, F. J.....Henderson
Wohlrabe, C. F.....North Mankato
Wolner, O. H.....St. Peter
Woodworth, L. F.....Le Center

OLMSTED-HOUSTON-FILLMORE-DODGE COUNTY MEDICAL SOCIETY

Regular meetings, first Wednesday every odd month
Annual meeting, November
Number of Members: 475

President
Brown, P. W.....Rochester
Secretary
Anderson, M. J.....Rochester

Adams, R. C.....Rochester
Adson, A. W.....Rochester
Affeldt, D. E.....Kasson
Ahlfs, Jacob.....Caledonia
Aita, J. A.....Rochester
Albers, G. D.....Rochester
Allen, E. V.....Rochester
Alvarez, W. C.....Rochester
Amberg, Samuel.....Rochester
‡Ambrusko, J. S.....Rochester
‡Anderson, B. M.....Rochester
Anderson, C. D.....Rochester
Anderson, E. M.....Rochester
Anderson, M. J.....Rochester
Arny, F. P.....Preston
Ashburn, F. S.....Rochester

Babb, F. S.....Rochester
‡Baggenstoss, A. H.....Rochester
Bair, H. L.....Rochester
Baker, G. S.....Rochester
Baker, H. R.....Hayfield
Baker, R. L.....Hayfield
Balfour, D. C.....Rochester
Bargen, J. A.....Rochester
Barker, N. W.....Rochester
Barnes, A. R.....Rochester
Beard, Crowell.....Rochester
Beizer, L. H.....Rochester
Belote, G. B.....Caledonia
Benedict, W. L.....Rochester
Bennett, J. K.....Rochester
Bennett, W. A.....Rochester
Benson, R. E.....Rochester
Berkman, D. M.....Rochester
Berkman, J. M.....Rochester
Bickel, W. H.....Rochester
Bigelow, C. E.....Dodge Center
Binger, M. W.....Rochester
Black, B. M.....Rochester
Blackwell, W. J.....Rochester
Blaisdell, J. S.....Rochester
Boothby, W. M.....Rochester
Bowing, H. H.....Rochester

Braasch, W. F.....Rochester
Bradshaw, S. P.....Rochester
Breslow, Lester.....Rochester
Brindley, G. V., Jr.....Rochester
Brooks, S. M.....Rochester
Broders, A. C.....Rochester
Brown, A. E.....Rochester
Brown, G. E., Jr.....Pine City
Brown, H. A.....Rochester
Brown, J. R.....Rochester
Brown, M. H.....Rochester
Brown, P. W.....Rochester
Browne, H. C., Jr.....Rochester
Brunsting, L. A.....Rochester
Bryson, J. C.....Rochester
Buck, R. M.....Rochester
Buie, L. A.....Rochester
Burchell, H. B.....Rochester
Burdon, Phyllis J.....Rochester
Burkhart, R. J.....Rochester
Butt, H. R.....Rochester

Caldwell, H. W.....Rochester
Call, J. D.....Rochester
Camp, J. D.....Rochester
Campbell, C. M.....Rochester
Campbell, D. C.....Rochester
Campbell, J. R.....Rochester
Canfield, W. W.....Houston
Carryer, H. M.....Rochester
Chapman, A. S.....Rochester
Christensen, B. H.....Rochester
Clagett, O. T.....Rochester
Clark, L. W.....Spring Valley
Clarke, E. T.....Rochester
Clifton, T. A.....Chatfield
Comfort, M. W.....Rochester
Condon, W. B.....Rochester
†Conner, H. M.....Rochester
Cook, E. N.....Rochester
Cooper, Talbert.....Rochester
Corbitt, R. W.....Rochester
Counseller, V. S.....Rochester
Coventry, M. B.....Rochester
Cragg, R. W.....Rochester
Craig, W. McK.....Rochester
Crenshaw, J. L.....Rochester
Crewe, J. E.....Rochester
Cummings, D. W.....Rushford

Cunningham, B. P.....Rochester
Currens, J. H.....Rochester
Cusick, P. L.....Rochester
Darling, J. P.....Rochester
Daugherty, G. W.....Rochester
Davies, L. T.....Rochester
Davis, A. C.....Rochester
Davis, I. G.....Rushford
Day, Lois.....Rochester
Dearing, W. H.....Rochester
Demonş, C. V.....Rochester
Desjardins, A. U.....Rochester
Dix, C. R.....Rochester
Dixon, C. F.....Rochester
Dobyns, B. M.....Rochester
Dockerty, M. B.....Rochester
Dolder, F. C.....Eyota
Donald, C. J., Jr.....Rochester
Downing, G. C.....Rochester
†Drake, F. A.....Lanesboro
Drapiewski, J. F.....Rochester
Drips, Della G.....Rochester
Dry, T. J.....Rochester
Dunlap, D. L.....Rochester
Eaton, L. McK.....Rochester
Egan, Sherman .....Rochester
Eginton, C. T.....Rochester
Ehni, G. J.....Rochester
Elkins, E. C.....Rochester
Emerson, G. F.....Rochester
Emmett, J. L.....Rochester
English, J. P.....Rochester
Erich, J. B.....Rochester
‡Erickson, C. O.....Rochester
Erickson, E. W.....Rochester
Evans, C. H., Jr.....Rochester
†Evarts, A. B.....Rochester
Eusterman, G. B.....Rochester
Faber, J. E.....Rochester
Fahlund, G. T. R.....Rochester
Fawcett, R. M.....Rochester
Feldman, F. M.....Rochester
Fenstermacher, R. H.....Rochester
Ferguson, F. F.....Detroit, Mich.
‡Ferguson, W. J., Jr.....Rochester
Ferris, D. O.....Rochester
Figi, F. A.....Rochester
Flinn, J. H.....Rochester

Fogarty, C. W., Jr.....Rochester
Forney, R. A.....Rochester
Foss, E. L.....Rochester
Foster, M. A.....Rochester
Foster, T. N.....Rochester
Fricke, R. E.....Rochester

Gaarde, F. W.....Rochester
Gambill, E. E.....Rochester
Gelbach, P. D.....Rochester
Ghormley, R. K.....Rochester
Giffin, H. M.....Rochester
Giffin, H. Z.....Rochester
Gillespie, D. R.....Rochester
Glomset, D. A.....Rochester
Glover, R. P.....Rochester
Good, C. A., Jr.....Rochester
Gore, H. R.....Rochester
Gorsuch, M. T.....Rochester
Graham, F. M.....Rochester
Grandy, A. Margaret,.....Rochester
‡Gray, H. K.....Rochester
Greene, L. F.....Rochester
Grinnell, W. B.....Preston
Guernsey, D. E.....Rochester
Guthrie, R. F.....Rochester

Habein, H. C.....Rochester
Haines, S. F.....Rochester
Haisten, A. S.....Rochester
Hall, B. E.....Rochester
Hallberg, O. E.....Rochester
Hallenbeck, D. F.....Rochester
Hallenbeck, G. A.....Rochester
Hardman, Sue C.....Rochester
Hargraves, M. M.....Rochester
Harley, R. D.....Rochester
Harper, S. B.....Rochester
Harrington, S. W.....Rochester
Hartman, H. R.....Rochester
‡Harvey, George, Jr.....Rochester
Hausmann, P. F.....Rochester
Havens, F. Z.....Rochester
Heck, F. J.....Rochester
Heersema, P. H.....Rochester
Heilman, Charles.....Fargo, N. D.
Heilman, Dorothy M. H...Rochester
Heilman, F. R.....Rochester
Helland, G. M.....Spring Grove
Helland, J. W.....Spring Grove
Helmholz, H. F.....Rochester
Hempstead, B. E.....Rochester
Hench, P. S.....Rochester
Henderson, J. W.....Rochester
Henderson, M. S.....Rochester
Herbst, R. F.....Wykoff
Herrell, W. E.....Rochester
Hewitt, Edith S.....Rochester
†Hewitt, R. M.....Rochester
†Heyerdale, O. C.....Rochester
Heyerdale, W. W.....Rochester
Higginson, J. F.....Rochester
Hildebrand, Alice G.....Rochester
Hill, J. R.....Rochester
Hines, E. A., Jr.....Rochester
Hinshaw, H. C.....Rochester
Hoagland, P. I., Jr.....Rochester
Hodgson, Jane E.....Rochester
Hopkins, E. O.....Rochester
Hopping, R. A.....Rochester
Horton, B. T.....Rochester
Howell, L. P.....Rochester
Hoyne, R. M.....Rochester
Hughes, T. J.....Rochester
Hummer, G. J.....Rochester
Hunt, A. B.....Rochester

Iverson, R. M.....Rochester
Ivie, J. McK.....Rochester

Jackman, R. J.....Rochester
Jacobson, C. E., Jr.....Rochester
Johnson, C. R.....Rochester
Johnson, H. P.....Harmony
Johnson, R. B.....Lanesboro
Joss, C. S.....Rochester
Joyce, G. L.....Rochester
Judd, D. B.....Rochester
Judd, E. S.....Rochester
‡Jump, W. C.....Kasson

Kapernick, J. S.....Rochester
Kauvar, A. J.....Rochester
Keating, F. R., Jr.....Rochester
Keith, H. M.....Rochester
Keith, N. M.....Rochester
Kennedy, R. L. J.....Rochester
Kepler, E. J.....Rochester
Kernohan, J. W.....Rochester
Kierland, R. R.....Rochester
Kiernan, P. C.....Rochester
Kirklin, B. R.....Rochester
Kirklin, O. L.....Rochester
Klinkenberg, R. B.....Rochester
Kloos, E. K.....Rochester
Koelsche, G. A.....Rochester
Kreilkamp, B. L.....Rochester
Krusen, F. H.....Rochester
Kvale, W. F.....Rochester

Lander, H. H.....Rochester
Lannin, J. C.....Mabel
Large, H. R.....Rochester
Larrabee, W. F., Jr.....Rochester
Latchem, C. W.....Rochester
Leddy, E. T.....Rochester
Lehnhoff, H. J., Jr.....Rochester
Lemon, W. S.....Rochester
Levinson, J. P.....Rochester
‡Lien, R. J.....Rochester
Lillie, H. I.....Rochester
Lillie, J. C.....Rochester
Lindahl, W. W.....Rochester
Little, A. G.....Rochester
Lipscomb, P. R.....Rochester
†Lochead, D. C.....Rochester
Logan, A. H.....Rochester
Logan, G. B.....Rochester
Love, J. G.....Rochester
‡Love, W. R.....Rochester
Lovelace, W. R.....Rochester
Lovelady, S. B.....Rochester
Lovering, Joseph.....Rochester
Lovshin, L. L.....Rochester
Luckey, C. A.....Rochester
Lueck, A. G.....Rochester
Lundy, J. S.....Rochester
Luden, Georgine..Victoria, B. C., Can.
Lynch, R. C.....Rochester

†MacCarty, W. C.....Rochester
MacCarty, W. C., Jr.....Rochester
Macey, H. B.....Rochester
MacKay, H. J.....Seattle, Wash.
MacLean, A. R.....Rochester
‡Magath, T. B.....Rochester
Maino, C. R.....Rochester
Manlove, F. R.....Rochester
†Mann, F. C.....Rochester
Martin, G. M.....Rochester
Mason, B. A.....Rochester
Masson, D. M.....Rochester
Masson, J. C.....Rochester
Mayo, C. W.....Rochester
Maytum, C. K.....Rochester
McCall, C. H.....Rochester
McCallig, J. J.....Rochester
McCloud, C. N., Jr.....Rochester
McDonald, J. R.....Rochester
McEachern, C. G.....Rochester
McKaig, C. B.....Pine Island
McNairy, D. J.....Rochester
Mead, F. B.....Rochester
Merritt, W. A.....Rochester
Messler, J. D.....Rochester
Meyerding, H. W.....Rochester
Miller, J. R., Jr.....Rochester
Moersch, F. P.....Rochester
Moersch, H. J.....Rochester
Montgomery, Hamilton.....Rochester
Moreton, R. D.....Rochester
Morissette, Leopold.....Rochester
Morlock, C. G.....Rochester
Mousel, L. H.....Rochester
Murray, R. A.....Rochester
Musgrove, J. E.....Rochester
Mussey, R. D.....Rochester

Nass, H. A.....Mabel
Nay, R. M.....Rochester
Neel, R. M.....Rochester
Nehring, J. P.....Preston
New, G. B.....Rochester
Nichols, D. R.....Rochester
Norris, N. T.....Caledonia

Odel, H. M.....Rochester
O'Leary, P. A.....Rochester
Olsen, A. M.....Rochester
Olson, E. A.....Pine Island
Olson, G. E.....West Concord
Olson, J. D.....Rochester
Olson, S. W.....Rochester
Onsgard, L. K.....Houston

Parker, R. L.....Rochester
Parkhill, Edith M.....Rochester
Pattison, D. H.....Rochester
Paulson, D. L.....Rochester
Paulson, J. A.....Rochester
Pearson, D. J.....Rochester
Pemberton, J. deJ.....Rochester
Pender, J. W.....Rochester
Pennington, R. E.....Rochester
Perry, T. T.....Rochester
Peters, G. A.....Rochester
Peterson, W. G.....Rochester
‡Phalen, G. S.....Rochester
Piper, M. C.....Rochester
Plimpton, N. C., Jr.....Rochester
Plummer, W. A.....Rochester
Polley, H. F.....Rochester
Pollock, L. W.....Rochester
Polmeteer, F. E.....Rochester
Pool, T. L.....Rochester
Popp, W. C.....Rochester
Powers, F. H.....Rochester
Prangen, A. D.....Rochester
Pratt, J. H., Jr.....Rochester
Preston, F. W.....Rochester
Prickman, L. E.....Rochester
Priestley, J. T.....Rochester
Proudfit, C. H.....Rochester
Pruitt, R. D.....Rochester
Pugh, D. G.....Rochester

Radcliffe, James, Jr.....Rochester
Randall, L. M.....Rochester
Rasmussen, W. C.....Rochester
Raszkowski, H. J.....Rochester
‡Richardson, R. J.....Rushford
Richardson, W. E.....Rushford
Rigos, F. J.....Rochester
Risser, A. F.....Stewartville
Rivers, A. B.....Rochester
Robertson, H. E.....Rochester
Robinson, F. J.....Rochester
Rogne, W. G.....Spring Grove
Root, G. T.....Rochester
Rosenberg, E. F.....Rochester
Rosenow, E. C.....Rochester
Rosenow, J. H.....Rochester
Rucker, C. W.....Rochester
Russ, F. H.....Rochester
Rynearson, E. H.....Rochester

Sanford, A. H.....Rochester
Sayre, G. P.....Rochester
Scales, J. R.....Rochester
Scheetz, R. J.....Rochester
Scheifley, C. H.....Rochester
Schlicke, C. P.....Rochester
Schmidt, H. W.....Rochester
Schmitz, R. L.....Rochester
‡Schneider, H. H..Santa Monica, Calif.
Schunke, G. B.....Rochester
Scott, F. M.....Shelbyville, Ind.
Sealy, W. B.....Rochester
Seefeld, P. H.....Rochester
Seldon, T. H.....Rochester
Seybold, W. D.....Rochester
Sharpe, W. S.....Minneapolis
Shelden, J. T.....Rochester
Shelden, W. D.....Rochester
Shepard, V. D.....Rochester
Shick, R. M.....Rochester
Sidell, C. M.....Rochester
Simonton, K. M.....Rochester
Slocumb, C. H.....Rochester
Sluder, F. S., Jr.....Rochester
Smalley, R. E.....Rochester
Smith, B. F.....Rochester
Smith, F. D.....Rochester
Smith, F. H.....Rochester
Smith, F. L.....Rochester
Smith, H. L.....Rochester
Smith, K. A.....Rochester
Smith, L. A.....Rochester
Smith, N. D.....Rochester
Smith, R. L., Jr.....Rochester
‡Snell, A. M.....Rochester
Sprague, R. G.....Rochester
Standard, W. P.....Rochester
Stark, F. M.....Rochester
Stevenson, W. D., Jr.....Quincy, Ill.
Stickney, J. M.....Rochester
Stilwell, G. G.....Rochester
Stout, H. A.....Rochester
Stover, Lee.....Rochester
Stroebel, C. F., Jr.....Rochester
Strom, G. W.....Rochester
Stuhler, L. G.....Rochester
Sutherland, C. G.....Rochester
Svien, H. J.....Rochester

Tanner, F. H.....Rochester
Tennison, William, III..Arcadia, Calif.
Thompson, G. J.....Rochester
Thornell, W. C.....Rochester
Thorson, S. B.....Rochester
Throckmorton, T. D.....Rochester
Tierney, C. M.....Harmony
Tillisch, J. H.....Rochester
Tinney, W. S., Jr.....Rochester
Trandem, C. Elinor.....Rochester
Treusch, J. V.....Rochester
Trimingham, H. G. L.....Rochester
Tuohy, E. B.....Rochester
Tweedy, J. A.....Rochester
Twyman, R. A.....Rochester

Uihlein, Alfred.....Rochester
Underdahl, L. O.....Rochester

Vadheim, J. L.....Rochester
Van Demark, R. E.....Rochester
Vaughn, L. D.....Rochester
Vines, R. W.....Rochester

Wagener, H. P.....Rochester
Wakefield, E. G.....Rochester
Wallace, W. B.....Rochester

Walsh, M. N.....Rochester
Walters, Waltman.....Rochester
Ward, B. H.....Rochester
Watkins, C. H.....Rochester
Waugh, J. M.....Rochester
Weber, H. M.....Rochester
Weir, J. F.....Rochester
Weisel, Wilson.....Rochester
Wells, G. R.....Rochester
White, R. R., III.....Rochester
Whitehouse, F. R.....Rochester
Wiig, L. M.....Rochester
Wilder, R. M.....Rochester
Wilder, R. M., Jr.....Rochester
Wilhelm, Agatha M.....Rochester
Williams, H. L.....Rochester
Williams, R. D.....Rochester
Williams, R. V.....Rushford
Willius, F. A.....Rochester
Willson, D. M.....Rochester
Wilson, K. G.....Rochester
Wilson, L. B.....Rochester
Wollaeger, E. E.....Rochester
Woltman, H. W.....Rochester
Wood, H. G.....Rochester
Wood, W. W., Jr.....Rochester
Woodruff, C. W.....Chatfield
Wulf, R. F.....Rochester
Wyrens, R. G.....Rochester
Yeager, C. L.....Rochester
Young, H. H.....Rochester

PARK REGION DISTRICT AND COUNTY MEDICAL SOCIETY

Douglas, Grant, Otter Tail and Wilkin Counties
Regular meetings, Second Wednesday every other month
Annual meeting, December
Number of Members: 60

President
Leibold, H. H.....Parkers Prairie

Secretary
Nelson, W. O. B.....Fergus Falls

Arndt, H. W.....Detroit Lakes
Baker, A. C.....Fergus Falls
Baker, N. H.....Fergus Falls
Bergquist, K. E.....Battle Lake
Blakey, A. R.....Osakis
Boline, C. A.....Battle Lake
Boyd, L. M.....Alexandria
‡Boysen, J. E.....Pelican Rapids
Boysen, Peter.....Pelican Rapids
Broker, W. S.....Wadena
Burnap, W. L.....Fergus Falls
Clifford, G. W.....Alexandria
Combacker, L. C.....Fergus Falls
Drought, W. W.....Fergus Falls
Esser, John.....Perham
Estrem, C. O.....Fergus Falls
Freeman, W. N.....Perham
Griswold, F. E.....Hoffman
Hanson, E. C.....New York Mills
Haskell, A. D.....Alexandria
Heiberg, E. A.....Fergus Falls
Jacobs, G. C.....Fergus Falls
Johnson, O. V.....Fergus Falls
Kierland, P. E.....Alexandria
Lee, W. A.....Fergus Falls
Leibold, H. H.....Parkers Prairie
‡Leighton, Robert.....Evansville
Leland, J. T.....Herman
Lewis, A. J.....Henning
Love, F. A.....Carlos
Lund, C. J. T.....Fergus Falls
McLane, W. O.....Perham
McMahon, L. H.....Breckenridge
Miller, W. A.....New York Mills
Mouritsen, G. J.....Fergus Falls
Naegeli, Frank.....Fergus Falls
Nelson, R. A.....Fergus Falls
Nelson, W. O. B.....Fergus Falls
Parson, L. R.....Elbow Lake
Parson, Lillian B.....Elbow Lake
Patterson, W. L.....Fergus Falls
Paulson, T. S.....Fergus Falls
Paulson, E. C.....Elbow Lake
Randall, A. M.....Ashby
Reeve, E. T.....Elbow Lake
Rimer, E. W.....Breckenridge
Satersmoen, Theodore..Pelican Rapids
Sather, E. R.....Alexandria
Schamber, W. F.....Parkers Prairie
‡Scheinitz, F. B.....Battle Lake
Serkland, J. C.....Rothsay
Siegel, Clarence.....Battle Lake
Stemsrud, H. L.....Alexandria
Sutton, H. R.....Hoffman
Tanquist, E. J.....Alexandria
‡Vail, J. B.....Henning
Warner, J. J.....Perham
Wasson, L. F.....Alexandria
‡Webster, L. J.....Battle Lake
Wray, W. E.....Campbell

RAMSEY COUNTY MEDICAL SOCIETY

Regular meetings, last Monday in every month excepting June, July, August
Annual meeting, last Monday in January
Number of Members: 365

President
Drake, C. B.....St. Paul

Secretary
Ryan, J. M.....St. Paul

Abbott, J. S.....St. Paul
‡Adair, A. F., Jr.....St. Paul
Ahrens, A. E.....St. Paul
Ahrens, A. H.....St. Paul
Alberts, M. W.....St. Paul
Alden, J. F.....St. Paul
Alexander, F. H.....St. Paul
†Armstrong, J. M.....St. Paul
Arnquist, A. S.....St. Paul
Aurelius, J. R.....St. Paul
Ausman, C. F.....St. Paul
Bacon, D. K.....St. Paul
†Bacon, L. C.....St. Paul
Balcome, M. M.....St. Paul
Barnes, R. G., Jr.....Hastings
Barry, L. W.....St. Paul
Barsness, Nellie O. N.....St. Paul
Beals, Hugh.....St. Paul
Beech, R. H.....St. Paul
‡Beek, H. O.....St. Paul
Bell, C. C.....St. Paul
Benepe, J. L.....St. Paul
Bennion, P. H.....St. Paul
Bentley, N. P.....St. Paul
Bernstein, W. C.....St. Paul
Bicek, J. F.....St. Paul
Binger, H. E.....St. Paul
Birnberg, T. L.....St. Paul
Bock, R. A.....St. Paul
Boeckmann, Egil.....St. Paul
Bolender, H. L.....St. Paul
‡Borg, J. F.....St. Paul
Bouma, L. R.....St. Paul
Brand, G. D.....St. Paul
Bray, E. R.....St. Paul
Briggs, J. F.....St. Paul
Broadie, T. E.....St. Paul
Brodie, W. D.....St. Paul
†Brown, E. L.....St. Paul
Brown, J. C.....St. Paul
‡Bulinski, T. J.....St. Paul
‡Burch, E. P.....St. Paul
Burch, F. E.....St. Paul
Burns, R. M.....St. Paul
Burton, C. G.....St. Paul
Busher, H. H.....St. Paul
Cain, C. L.....St. Paul
Caldwell, J. P.....St. Paul
Carroll, W. C.....St. Paul
Chadbourn, C. R.....St. Paul
Chatterton, C. C.....St. Paul
Christiansen, A.....St. Paul
†Christison, J. T.....St. Paul
‡Clark, H. B., Jr.....St. Paul
†Clark, T. C.....Arlington, Va.
Clarke, E. K.....St. Paul
‡Cochrane, B. B.....St. Paul
‡Coddon, W. D.....St. Paul
Colby, W. L.....St. Paul
Cole, W. H.....St. Paul
†Collie, H. G.....St. Paul
Colvin, A. R.....St. Paul
Connor, C. E.....St. Paul
Cook, C. K.....St. Paul
Cooper, C. C.....St. Paul
Countryman, R. S.....St. Paul
Cowern, E. W.....Seattle, Wash.
Critchfield, L. R.....St. Paul
Crombie, F. J.....No. St. Paul
Culligan, J. M.....St. Paul
Dack, L. G.....St. Paul
†Daugherty, E. B., Marine-on-St. Croix
Daugherty, L. E.....St. Paul
†Davis, Herbert.....St. Paul
†Davis, William.....St. Paul
DeCourcey, D. M.....St. Paul
Dedolph, Karl.....St. Paul
Delavan, P. A.....St. Paul
Derauf, B. I.....St. Paul
Dickson, T. H.....St. Paul
Dittman, G. C.....St. Paul
Donohue, P. F.....St. Paul
Dovre, C. M.....St. Paul
Drake, C. B.....St. Paul
Dunn, J. N.....St. Paul
Earl, George.....St. Paul
Earl, John.....St. Paul
Earl, Robert.....St. Paul
Edlund, G.....St. Paul
Edwards, J. W.....St. Paul
Edwards, T. J.....St. Paul
Ely, O. S.....South St. Paul
Emerson, E. C.....St. Paul
Endress, E. K.....St. Paul
Enroth, O. E.....White Bear Lake
Ernest, G. C. H.....South St. Paul
†Eshelby, E. C.....St. Paul
Fahey, E. W.....St. Paul
Ferguson, J. C.....St. Paul
Fesler, H. H.....St. Paul
Flanagan, H. F.....St. Paul
Fogarty, C. W.....St. Paul
Fogelberg, E. J.....St. Paul
Foley, F. E. B.....St. Paul
Freeman, C. D.....St. Paul
Freidman, L. L.....St. Paul
Fritz, W. L.....St. Paul
Froats, C. W.....St. Paul
Gager, E. C.....St. Paul
Garbrecht, Arthur.....St. Paul
Gardiner, D. G.....St. Paul
Geer, E. K.....St. Paul
Gehlen, J. N.....St. Paul
Geist, G. A.....St. Paul
Ghent, C. H.....St. Paul
Gibbs, E. C.....St. Paul
†Gilfillan, J. S.....St. Paul
Gilkey, S. E.....St. Paul
Ginsberg, Wm.....St. Paul
Goltz, E. V.....St. Paul
Grant, H. W.....St. Paul
Gratzek, Thomas.....St. Paul
Grau, R. K.....St. Paul
Gruenhagen, A. P.....St. Paul
Hagaman, G. K.....St. Paul
Hall, A. R.....St. Paul
Hall, H. H.....St. Paul
Hammes, E. M.....St. Paul
Hammond, J. F.....St. Paul
Hanson, H. B.....St. Paul
Harmon, G. E.....St. Paul
Hartfiel, W. F.....St. Paul
Hartley, E. C.....St. Paul
Hassett, M. F.....St. Paul
Hauser, V. P.....St. Paul
†Heath, A. C.....Stillwater
Heck, W. W.....St. Paul
Hedenstrom, F. G.....St. Paul
Hengstler, W. H.....St. Paul
Hensel, C. N.....St. Paul
Herman, Samuel.....St. Paul
Heron, R. C.....St. Paul
Herrmann, E. T.....St. Paul
Hertz, M. J.....St. Paul
Hilger, A. W.....St. Paul
Hilger, D. D.....St. Paul
‡Hilger, J. A.....St. Paul
Hilger, L. A.....St. Paul
‡Hilger, L. D.....St. Paul
Hiniker, L. P.....St. Paul
Hochfilzer, J. J.....St. Paul
Hoff, Alfred.....St. Paul
Hoffman, M. H.....St. Paul
†Holcomb, J. T.....Marine-on-St. Croix
Holcomb, O. W.....St. Paul
Holmen, R. W.....St. Paul
Holt, J. E.....St. Paul
Hopkins, G. W.....St. Paul
Howard, M. A.....St. Paul
Howard, W. S.....St. Paul
Hullsiek, H. E.....St. Paul
‡Hullsiek, R. B.....St. Paul
Ide, A. W.....St. Paul
Ikeda, Kano.....St. Paul
Ingerson, C. A.....St. Paul
Ittner, G. W., Jr.....St. Paul

ROSTER

Jesion, J. W.....St. Paul
Johanson, W. G.....St. Paul
Johnson, A. M.....St. Paul
Johnson, C. E.....St. Paul
Johnson, J. A.....St. Paul
†Johnson, T. H...San Francisco, Calif.
Jones, E. M.....St. Paul

Kamman, G. R.....St. Paul
Kannary, E. L.....St. Paul
Kaplan, D. H.....St. Paul
‡Karn, J. F.....St. Paul
Karon, I. M.....St. Paul
Kasper, E. M.....St. Paul
Keefe, Rolland.....St. Paul
Kelly, J. V.....St. Paul
Kelly, P. H.....St. Paul
Kenefick, E. V.....St. Paul
Kennedy, W. A.....St. Paul
Kenyon, T. J.....St. Paul
Kesting, Herman.....St. Paul
King, G. L.....St. Paul
Klein, H. N.....St. Paul
Knauff, M. K.....St. Paul
Koepsell, A. A. H.....St. Paul
Kugler, A. A.....St. Paul
Kvitrud, Gilbert.....St. Paul

Langenderfer, F. V.....St. Paul
Larsen, C. L.....St. Paul
‡Lauer, D. J.....St. Paul
Lax, M. H.....St. Paul
Leahy, Bartholomew.....St. Paul
Leavenworth, R. O.....St. Paul
Leick, R. M.....St. Paul
Leitch, Archibald.....St. Paul
Lepak, J. A.....St. Paul
†Lerche, William .....Cable, Wis.
Leven, N. L.....St. Paul
Levin, Bert.....St. Paul
Levitt, G. X.....St. Paul
Lick, C. L.....St. Paul
Lightbourn, E. L.....St. Paul
Lippman, H. S.....St. Paul
†Little, W. J.....St. Paul
‡Loken, S. M.....St. Paul
Lowe, E. R.....South St. Paul
Lowe, T. A.....South St. Paul
Lundholm, A. M.....St. Paul
Lynch, F. W.....St. Paul

Madden, J. F.....St. Paul
*Markoe, J. C.....St. Paul
‡Marks, R. W.....St. Paul
Martin, D. L.....So. St. Paul
Martineau, J. L.....St. Paul
Mattson, C. H.....St. Paul
McCarthy, J. J.....St. Paul
McCarthy, W. R.....St. Paul
McClanahan, J. H.....White Bear
McClanahan, T. S.....White Bear
McEwan, Alexander.....St. Paul
†McLaren, Jennette M.....Minneapolis
*McNevin, C. F.....St. Paul
Meade, J. R.....St. Paul
Mears, B. J.....St. Paul
Medelman, J. P.....St. Paul
Meyerding, E. A.....St. Paul
Moga, J. A.....St. Paul
Molander, H. A.....St. Paul
Moquin, Marie A.....St. Paul
‡Moren, L. A.....St. Paul
Moriarty, Berenice.....St. Paul
†Morrissey, F. B.....St. Paul
Moss, M. N.....St. Paul
Muller, R. T.....St. Paul

Naegeli, A. E.....St. Paul
Nelson, L. A.....St. Paul
Nichols, A. E.....St. Paul
Noble, J. F.....St. Paul
Noble, J. L.....St. Paul
Nuebel, C. J.....St. Paul
Nye, Katherine A.....St. Paul
Nye, Lillian L.....St. Paul

‡O'Brien, W. M.....St. Paul
O'Connor, L. J.....St. Paul
Oerting, Harry.....St. Paul
Ogden, Warner.....St. Paul
Ohage, Justus, Jr.....St. Paul
Olson, C. A.....St. Paul
O'Reilley, B. E.....St. Paul
Ostergren, E. W.....St. Paul
Ostergren, Eva-Jane .....St. Paul
Ouelette, A. J.....St. Paul

Pearson, F. R.....St. Paul
Pearson, M. M.....St. Paul
Pederson, A. H.....St. Paul
Perry, C. G.....St. Paul
Peterson, D. B.....St. Paul
Peterson, H. O.....St. Paul
Peterson, J. L. E.....St. Paul
Peterson, V. N.....St. Paul
Plondke, F. J.....St. Paul
Prendergast, H. J.....St. Paul

Radabaugh, R. C.....Hastings
†Ramsey, W. R.....St. Paul
Rasmussen, R. C.....St. Paul
Rea, C. E.....St. Paul
Richards, E. T. F.....St. Paul
Richardson, H. E.....St. Paul
Rick, P. F. W.....St. Paul
Ritchie, H. P.....St. Paul
‡Ritchie, W. P.....St. Paul
Ritt, A. E.....St. Paul
Rogers, S. F.....St. Paul
Rosenbladt, Louis.....St. Paul
Rosenholtz, Burton.....St. Paul
Rosenthal, Robert.....St. Paul
†Rothrock, J. L.....St. Paul
Rothschild, H. J.....St. Paul
Roy, P. C.....St. Paul
Ruhberg, G. N.....St. Paul
Rutherford, W. C.....St. Paul
Ryan, J. J.....St. Paul
Ryan, J. M.....St. Paul
Ryan, M. E.....St. Paul

Sarnecki, M. M.....St. Paul
Satterlund, V. L.....St. Paul
Savage, F. J.....St. Paul
Schoch, R. B. J.....St. Paul
Schons, Edward.....St. Paul
Schuldt, F. C.....St. Paul
Schulze, A. G.....St. Paul
Schwyzer, Arnold.....St. Paul
‡Schwyzer, H. C.....St. Paul
Scott, E. E.....St. Paul
†Senkler, G. E.....St. Paul
Setzer, H. J.....St. Paul
Shannon, W. R.....St. Paul
Shellman, J. L.....St. Paul
Shillington, M. A.....Glendive, Mont.
‡Shimonek, S. W.....St. Paul
Short, Jacob.....St. Paul
‡Simons, L. T.....St. Paul
Singer, B. J.....St. Paul
Skinner, H. O.....St. Paul
Smisek, E. A.....St. Paul
Smith, V. D. E.....St. Paul
Snyder, G. W.....St. Paul
Sohlberg, O. I.....St. Paul
Sorem, M. B.....St. Paul
Souster, B. B.....St. Paul
Sprafka, J. M.....St. Paul
Steinberg, C. L.....St. Paul
Sterner, E. G.....St. Paul
Sterner, E. R.....St. Paul
Sterner, O. W.....St. Paul
Stewart, Alexander.....St. Paul
Stinnette, S. E.....St. Paul
Stolpestad, A. H.....St. Paul
Stolpestad, H. L.....St. Paul
Strate, G. E.....St. Paul
‡Strauss, M. L.....St. Paul
Swanson, J. A.....St. Paul
Swendson, J. J.....St. Paul

Teisberg, C. B.....St. Paul
‡Thompson, F. A.....St. Paul
Thoreson, M. O.....South St. Paul
Tifft, C. R.....St. Paul
Tracht, R. R.....St. Paul
Tregilgas, H. R.....South St. Paul

Veirs, Dean.....St. Paul
Veirs, Ruby S.....St. Paul
Venables, A. E.....St. Paul
Von der Weyer, William.....St. Paul

Waas, C. W.....St. Paul
Walker, A. E.....St. Paul
Walter, C. W.....St. Paul
Warnock, R. W.....St. Paul
Warren, C. A.....St. Paul
Watz, C. E.....St. Paul
Webber, F. L.....St. Paul
Weis, B. A.....St. Paul
Weisberg, Maurice .....St. Paul
Welch, M. C.....St. Paul
Wenzel, G. P.....St. Paul
Werner, O. S.....Cambridge
Wheeler, M. W.....St. Paul
Whitacre, J. C.....St. Paul
Whitmore, F. W.....St. Paul
Williams, A. B.....St. Paul
Williams, C. K.....St. Paul
Williams, J. A.....St. Paul
‡Williamson, G. A.....St. Paul
‡Wilson, J. A.....St. Paul
Wilson, J. V.....St. Paul
Winnick, J. B.....St. Paul
Wold, K. C.....St. Paul
‡Wolfe, H. H.....St. Paul
Wolff, H. J.....St. Paul
Wolkoff, H. J.....St. Paul

Youngren, E. R.....St. Paul

Zachman, L. L.....St. Paul
Zimmermann, H. B.....St. Paul

RED RIVER VALLEY MEDICAL SOCIETY

Kittson, Mahnomen, Marshall, Norman, Pennington, Polk, Red Lake and Roseau Counties

Regular meetings, Second Tuesday, February, April and October

Annual meeting, December

Number of Members: 61

President

Boardman, D. V.....Twin Valley

Secretary

Oppegaard, C. L.....Crookston

Adkins, C. M.....Thief River Falls
‡Anderson, W. E...Thief River Falls
Anderson, W. S.....Minneapolis

Behr, O. K.....Crookston
Berge, D. O.....Roseau
Berlin, A. S.....Hallock
Bertelson, O. L.....Crookston
Biedermann, Jacob..Thief River Falls
*Blegen, H. M.....Warren
Boardman, D. V.....Twin Valley
Bohl, G. W.....Ada
Bratrud, Edward....Thief River Falls
Brink, A. A.....Baudette
Brown, L. L.....Crookston

Cameron, J. H.....Erskine
Delmore, J. L., Jr.....Roseau
Delmore, J. L., Sr.....Roseau
Derifield, R. S.....Crookston

Ederer, J. J.....Mahnomen
Erickson, Eskil.....Halstad

Griffin, P. J.....Fertile

Haugseth, Enoch.....Twin Valley
Hedemark, H. H.....Thief River Falls
Helseth, H. K.....Thief River Falls
Henney, W. H.....McIntosh
Hollands, W. H.....Fisher
Holmstrom, C. H.....Warren

Jacobson, C. W.....Thief River Falls

Kirk, G. P.....East Grand Forks
Knutson, G. A.....Greenbush
Kostick, W. R.....Fertile

Leitch, N. M.....Warroad
Loken, Theodore.....Ada
Low, J. E.....Ronan, Mont.
Lynde, O. G.....Thief River Falls

Mellby, O. F.....Thief River Falls
Mercil, W. F.....Crookston
Morley, G. A.....Crookston

Nelson, H. E.....Crookston
Norman, J. F.....Crookston

Ohnstad, J. L.....McIntosh
Oppegaard, C. L.....Crookston
Oppegaard, M. O.....Crookston

Paradis, W. G.....Crookston
Parsons, J. G.....Crookston
Petkevich, F. M.....Red Lake Falls

Reff, A. R.....Crookston
Rice, H. R.....Roseau

Sather, Allen .....Fosston
Sather, G. A.....Fosston
Sather, R. N.....McIntosh
‡Sather, R. O.....Crookston
Shaleen, A. W.....Hallock
Shedlov, Abraham.....Fosston
Starekow, M. D.....Thief River Falls
Stevens, John.....Gonvick
Stocking, F. F.....Hallock
Stuurmanns, S. H.....Erskine

‡Teisberg, J. E.....Middle River
Torgerson, W. B.....Oklee

Uhley, C. G.....Crookston

Wiltrout, I. G.....Oslo

REDWOOD-BROWN COUNTY MEDICAL SOCIETY

Regular meetings, Quarterly
Annual meeting, May
Number of Members: 34

President
Fritsche, T. R.....New Ulm

Secretary
Fesenmaier, O. B.....New Ulm

Abbott, C. B.....Springfield
Anderson, E. M.....Lamberton
Benton, P. C.....Gibbon
Cairns, R. J.....Sanborn
Dubbe, F. H.....New Ulm
‡Dysterheft, A. F.....Gaylord
Eaves, G. B.....Wabasso
Esser, O. J.....New Ulm
Ferguson, W. C.....Walnut Grove
Fesenmaier, O. B.....New Ulm
Fritsche, Albert.....New Ulm
Fritsche, C. J.....New Ulm
Fritsche, T. R.....New Ulm
Gibbons, F. C.....Comfrey
Goblirsch, A. P.....Sleepy Eye
Hammermeister, T. F.....New Ulm
Hovde, Rolf.....Winthrop
Just, H. J.....Lafayette
Kusske, A. L.....New Ulm
Nuessle, W. G.....Springfield
Olson, K. L.....Minneapolis
Penk, E. R.....Springfield
Peterson, R. A.....Vesta
†Reineke, G. F.....New Ulm
Saffert, C. A.....New Ulm
Schroeppel, J. E.....Winthrop
Seifert, O. J.....New Ulm
Senescall, C. R.....Sleepy Eye
Shima, G. J.....Sleepy Eye
Vogel, H. A. L.....New Ulm
Vogel, J. H.....New Ulm
Wahlberg, E. W.....Sleepy Eye
Weiser, G. B.....New Ulm
Wohlrabe, E. J.....Springfield

RENVILLE COUNTY MEDICAL SOCIETY

Regular meetings, second Tuesday of each month
Annual meeting, November
Number of Members: 22

President
Mesker, G. H.....Olivia

Secretary
Billings, R. E.....Franklin

Adams, R. C.....Bird Island
Billings, R. E.....Franklin
Brand, W. A.....Redwood Falls
Bushard, W. J.....Bird Island
‡Ceplecha, S. F.....Redwood Falls
*Cole, H. B.....Redwood Falls
Cole, J. G.....Redwood Falls
Cosgriff, J. A.....Olivia
Dordal, J.....Sacred Heart
Erickson, R. E.....Hector
Fawcett, A. M.....Renville
Flinn, T. E.....Redwood Falls
Gaines, E. C.....Buffalo Lake
‡Hartmann, C. M.....Fairfax
Johnson, O. H.....Redwood Falls
Johnson, W. E.....Morgan
Lenz, J. R.....Morton
Mesker, G. H.....Olivia
Passer, A. A.....Olivia
Penhall, F. W.....Morton
Preisinger, J. W.....Renville
Rinkey, Eugene.....Redwood Falls
Ryan, J. D.....Fairfax

RICE COUNTY MEDICAL SOCIETY

Regular meetings, at call
Annual meeting, at call
Number of Members: 30

President
Hanson, A. M.....Faribault

Secretary
Weaver, P. H.....Faribault

Babcock, F. M.....Northfield
Beede, Ethel R.....Faribault
Dugan, L. F.....Faribault
Dungay, N. S.....Northfield
Engberg, E. J.....Faribault
Francis, D. W.....Morristown
*Haessly, S. B.....Faribault
Hanson, A. M.....Faribault
Huxley, F. R.....Faribault
Kanne, C. W.....Faribault
Lexa, F. J.....Lonsdale
Lufkin, C. D.....Northfield
Lundberg, Ruth I.....Faribault
Lyght, C. E.....Northfield
McKeon, J. O.....Montgomery
Mears, R. F.....Northfield
Meyer, P. F.....Faribault
Moses, Joseph, Jr.....Northfield
Nielsen, A. M.....Northfield
Nuetzman, A. W.....Faribault
Ould, C. L.....Minneapolis
Robilliard, C. M.....Faribault
Rohrer, C. A.....Waterville
‡Rumpf, C. W.....Faribault
†Rumpf, W. H.....Faribault
Stevenson, F. W.....Faribault
Traeger, C. A.....Faribault
Warren, F. S.....Washington, D. C.
Weaver, P. H.....Faribault
West, E. J.....Faribault
Wilson, Warren.....Northfield

ST. LOUIS COUNTY MEDICAL SOCIETY

Carlton, Cook, Itasca, Lake and St. Louis Counties
Regular meetings, second Thursday every month
Annual meeting, December
Number of Members: 242

President
MacRae, G. C.....Duluth

Secretary
Buckley, R. P.....Duluth
Abraham, A. L.....Duluth

Adams, B. S.....Hibbing
Addy, E. R.....Gilbert
Ahl, C. W.....Hibbing
Akins, W. M.....Eveleth
Anderson, H. R.....Deer River
‡Anderson, C. L.....Duluth
Arko, J. L.....Hibbing
Armstrong, E. L.....Duluth
Athens, A. G.....Duluth
Ayres, G. T.....Ely
Bagley, C. M.....Duluth
Bagley, Elizabeth C.....Duluth
Bagley, W. R.....Duluth
Bakkila, Henry.....Duluth
Bardon, Richard.....Duluth
Barney, L. A.....Duluth
Barrett, E. E.....Duluth
Becker, F. T.....Duluth
Bender, J. H.....Big Fork
Bepko, Marie K.....Cloquet
Berdez, G. L.....Duluth
Bianco, A. J.....Duluth
Binet, H. E.....Grand Rapids
Blakely, C. C.....Barnum
Boman, P. G.....Duluth
Bowen, R. L.....Hibbing
Boyer, S. H., Jr.....Duluth
Boyer, S. H., Sr.....Duluth
Braun, O. C.....Nashwauk
Braverman, N. J.....Duluth
Bray, P. N.....Duluth
Bray, R. B.....Biwabik
Buckley, R. P.....Duluth
Butler, J. K.....Carlton
Cantwell, W. F.....International Falls
Carstens, C. F.....Hibbing
Chapman, T. L.....Duluth
†Cheney, E. L.....Duluth
Chermak, F. G.....International Falls
Chesley, Ward B.....Virginia
Christensen, C. H.....Duluth
Christensen, E. P.....Two Harbors
Clapp, Stewart.....Duluth
Clark, F. F.....Duluth
Clegg, R. S.....Duluth
‡Clement, T. G.....Duluth
Collins, A. N.....Duluth
†Collins, H. C.....Duluth
Coventry, W. A.....Duluth
Coventry, W. D.....Duluth
Cunningham, C. B.....Virginia
Davies, R. J.....Nopeming
Doolittle, L. E.....Duluth
Doyle, G. C.....Duluth
Eckman, P. F.....Duluth
Eckman, R. J.....Duluth
Ekblad, J. W.....Duluth
Elias, F. J.....Duluth
Elliott, W. S.....Virginia
Emanuel, K. W.....Duluth
Eppard, R. M.....Cloquet
Erskine, G. M.....Grand Rapids
Estrem, T. A.....Hibbing
Ewens, H. B.....Virginia
Fankboner, A. V.....Buhl
Fawcett, K. R.....Duluth
‡Fellows, M. F.....Duluth
Feuling, J. C.....Bovey
Fischer, M. McC.....Duluth
Fisketti, Henry.....Duluth
Forbes, R. S.....Duluth
Gendron, J. F.....Grand Rapids
Gillespie, M. G.....Duluth
*Gillespie, N. H.....Duluth
Goldish, D. R.....Duluth
Goodman, C. E.....Virginia
‡Gowan, L. R.....Duluth
‡Grabow, J. J.....Duluth
*Graham, Robert.....Duluth
Grahek, J. P.....Ely
Graves, W. N.....Duluth
Haney, C. L.....Duluth
Hanson, E. O.....Cloquet
Harlowe, H. D.....Virginia
Harri, E. J.....Carlton
Harris, C. N.....Hibbing
Hatch, W. E.....Duluth
‡Hathaway, S. J.....Proctor
Hayes, M. F.....Nashwauk
Hedberg, G. A.....Nopeming
Heiam, W. C.....Cook
Hilding, A. C.....Duluth
Hill, F. E.....Duluth
Hirschboeck, F. J.....Duluth
†Hirschfield, M. S.....Duluth
Hoff, H. O.....Duluth
Honke, R. W.....Proctor
Houkom, S. S.....Duluth
Hursh, M. M.....Hibbing
Hutchinson, Henry.....Moose Lake
Jacobson, Clarence.....Chisholm
Jensen, T. J.....Duluth
Jessico, C. M.....Duluth
‡Johnson, K. E.....Duluth
Jolin, F. M.....Bovey
Jolin, R. V.....Grand Rapids
Kelly, A. C.....Duluth
Kemp, M. W.....Moose Lake
Kiesling, I. H.....Coleraine
Kingsbury, E. M.....Moose Lake

Klein, Harry.....Duluth
Knapp, F. N.....Duluth
Kohlbry, C. O.....Duluth
Kotchevar, F. R.....Eveleth
‡Kozberg, Oscar.....Moose Lake
Kraft, Peter.....Duluth
*Kuth, J. R.....Duluth

La Bree, R. H.....Duluth
Laird, A. T.....Nopeming
Lenont, C. B.....Virginia
Lepak, F. J.....Duluth
Litman, S. N.....Duluth
Loofbourrow, E. H.....Keewatin
Lynam, Frank.....Duluth

Macfarlane, P. H.....Chisholm
‡MacRae, G. C.....Duluth
Magney, F. H.....Duluth
Malmstrom, J. A.....Virginia
Manley, J. R.....Duluth
†Marcley, W. J.....Minneapolis
Martin, W. C.....Duluth
‡Mayne, R. M.....Duluth
McCarty, P. D.....Ely
†McComb, C. F.....Duluth
†McCoy, Mary K.....Duluth
McDonald, A. L.....Duluth
McHaffie, O. L.....Duluth
McKenna, M. J.....Grand Rapids
McLeod, J. L.....Grand Rapids
McNutt, J. R.....Duluth
Mead, C. H.....Duluth
Merriman, L. L.....Duluth
‡Meyer, J. O.....Grand Rapids
Minty, Earl W.....Duluth
Moe, R. J.....Duluth
Moe, Thomas.....Moose Lake
‡Mollers, T. P.....Mountain Iron
Monroe, P. B.....Two Harbors
Monserud, N. O.....Cloquet
More, C. W.....Eveleth
Morsman, L. W.....Hibbing
Mueller, R. F.....Two Harbors
Mueller, Selma C.....Duluth

Neff, W. S.....Virginia
Nelson, E. H.....Chisholm
Nelson, L. S.....Hibbing
Nelson, R. L.....Duluth
Nicholson, M. A.....Duluth
Nissen, A. S.....Duluth
Norberg, C. E.....Cloquet
Nutting, R. E.....Duluth

Olson, A. E.....Duluth
Olson, A. O.....Duluth

Palmer, Frances.....Moose Lake
Palmer, H. A.....Black Duck
†Parker, O. W.....Ely
Parker, W. H.....Chisholm
Parson, E. I.....Duluth
Pasek, A. W.....Cloquet
Patch, O. B.....Duluth
Patterson, S. A.....Duluth
Pearsall, R. P.....Virginia
Pedersen, R. C.....Duluth
Pennie, D. F.....Duluth
Peterson, E. N.....Virginia
‡Peterson, J. H.....Duluth
Pfuetze, K. H.....Cannon Falls
Plowman, E. T.....Marble
Power, J. E.....Duluth
Puumala, R. H.....Cloquet

Raadquist, C. S.....Hibbing
Raihala, John.....Virginia
*Raiter, F. W. S.....Cloquet
Raiter, R. F.....Cloquet
†Robinson, J. M.....Corning, N. Y.
Rokala, H. E.....Virginia
Rood, D. C.....Duluth
Rosenfield, A. B.....Hibbing
Rowe, O. W.....Duluth
Rowles, E. K.....Coleraine
Rud, N. E.....Two Harbors
‡Rudie, P. S.....Duluth
Ryan, W. J.....Duluth

‡Sach-Rowitz, Alvan.....Moose Lake
Salter, R. A.....Virginia
Sarff, O. E.....Virginia
Sax, S. G.....Duluth
Scherer, C. A.....Duluth
Schroder, C. H.....Duluth
Schweiger, T. R.....Hibbing
‡Seashore, R. T.....Duluth
Shapiro, E. Z.....Duluth
Shastid, T. H.....Duluth
Shaw, A. W.....Virginia
Sher, D. A.....Hibbing
Siegel, J. S.....Virginia
Sinamark, Andrew.....Hibbing
Sisler, C. E.....Grand Rapids
Smith, C. M.....Duluth
Smith, W. R.....Grand Marais
Snyker, O. E.....Ely
Spang, A. J.....Duluth
Spang, J. S.....Duluth
Spicer, F. W.....Duluth
Spurbeck, R. G.....Cloquet
Strathern, M. L.....Gilbert
‡Stewart, D. E.....Grand Rapids
Strobel, W. G.....Duluth
Stuart, A. B.....Cloquet
Sutherland, H. N.....Ely
Sutton, Janet B.....Grand Rapids
‡Swanson, P. E.....Virginia
‡Swedberg, W. A.....Duluth
‡Swenson, A. O.....Duluth

Taylor, C. W.....Duluth
Terrell, B. J.....Nopeming
‡Tibbetts, M. H.....Duluth
Tilderquist, D. L.....Duluth
Tingdale, Carlyle.....Hibbing
‡Trytten, E. G.....Middle River
‡Tudor, R. B.....Hibbing
Tuohy, E. L.....Duluth

‡Urberg, S. E.....Duluth

Van Valkenberg, J. D.....Floodwood
Vercellini, C. E.....Duluth

†Walker, A. E.....Duluth
Wallace, M. O.....Duluth
Watson, C. G.....Soudan
Webber, E. E.....Duluth
Wells, A. H.....Duluth
Welton, P. C.....Wabasha
‡Wheeler, D. W.....Duluth
Winter, J. A.....Duluth

Young, T. O.....Duluth

Zlatovski, M. L.....Duluth

SCOTT-CARVER COUNTY MEDICAL SOCIETY

Regular meetings, second Tuesday of the month

Annual meeting, June

Number of Members: 34

President

Schimelpfenig, G. T.....Chaska

Secretary

Pearson, B. F.....Shakopee

Bodaski, A. A.....Montgomery
Buck, F. H.....Shakopee
Cervenka, C. F.....New Prague
Crow, E. R.....Arlington
‡Dworak, A. F.....St. Paul
Eklund, E. J.....Norwood
Emmerson, W. S.....Mayer
Havel, H. W.....Jordan
Hebeisen, M. B.....Chaska
Juergens, H. M.....Belle Plaine
Klein, J. C.....Shakopee
Kortsch, F. P.....Prior Lake
Kucera, L. J.....Lonsdale
Kucera, S. T.....Lonsdale
Maertz, W. F.....New Prague
Malerich, J. A.....Shakopee
Martin, T. P.....Arlington
Nagel, H. D.....Waconia
Nelson, K. L.....Montgomery
Novak, E. E.....New Prague
Olson, C. J.....Belle Plaine
Ormond, D. T.....Waconia
Pearson, B. F.....Shakopee
Phillips, W. H.....Jordan
Pogue, R. E.....Watertown
Ponterio, J. E.....Shakopee
†Reiter, H. W.....Shakopee
Schimelpfenig, G. T.....Chaska
†Shrader, J. S.....Springfield
Simons, B. H.....Chaska
†Westerman, A. E.....Montgomery
Westerman, F. C.....Montgomery
‡Wiechman, F. H.....Montgomery
Wunder, H. E.....Shakopee

SOUTHWESTERN MINNESOTA MEDICAL SOCIETY

Cottonwood, Jackson, Murray, Nobles, Pipestone and Rock Counties

Annual meeting, November

Number of Members: 64

President

Harrison, P. W.....Worthington

Secretary

Mork, B. O., Jr.....Worthington

Anderson, O. W.....Luverne
Arnold, E. W.....Adrian

Balmer, A. I.....Pipestone
Basinger, H. P.....Windom
Basinger, H. R.....Mountain Lake
Beckering, Gerrit.....Edgerton
Benjamin, W. G.....Pipestone
Bofenkamp, F. W.....Luverne
*Bong, J. H.....Jasper
Brown, A. H.....Pipestone

Carlson, J. V.....Westbrook
†Chadbourn, A. G.....Heron Lake
Chunn, S. S.....Pipestone
Cress, P. J.....Ellsworth

DeBoer, Hermanus.....Edgerton
Doman, V. W.....Lakefield
Doms, H. C. A.....Slayton
Halloran, W. H.....Jackson
Halpern, D. J.....Brewster
Harrison, P. W.....Worthington
‡Hebbel, Robert.....Minneapolis
Heiberg, O. M.....Worthington
Hifchings, W. S.....Lakefield
Hoyer, L. J.....Windom

Johnson, R. E.....Worthington
Johnston, L. F.....Slayton
Kilbride, E. A.....Worthington
Kilbride, J. S.....Worthington

Larson, J. T.....Lake Wilson
Lohmann, J. G.....Jasper

Maitland, D. P.....Jackson
Maitland, E. T.....Jackson
†Manson, F. M.....Worthington
McElmeel, E. F.....Pipestone
McLane, Evelyn G.....Jackson
Mork, B. O., Jr.....Worthington
Mork, B. O., Sr.....Worthington

Nealy, D. E.....Adrian

Pankratz, P. J.....Mountain Lake
Pierson, R. F.....Slayton
Piper, W. A.....Mountain Lake
Rogers, C. W.....Heron Lake
Rose, J. T.....Lakefield

Schade, F. L.....Worthington
Schutz, E. S.....Mountain Lake
Schmidt, W. R.....Worthington
Sether, A. F.....Ruthton
Sherman, C. I.....Luverne
Sjostrom, L. E.....Storden
Slater, S. A.....Worthington
Smith, G. G.....Fulda
Sogge, L. L.....Windom
Sorum, F. T.....Jasper
Stanley, C. R.....Worthington
Stevenson, B. M.....Fulda
Stratte, H. C.....Windom

Taylor, E. S.....Worthington
Thorson, E. O.....Luverne
Tofte, Josephine.....Minneapolis

Waller, J. D.....Wilmont
Wells, W. B.....Jackson
Williams, C. A.....Pipestone
Williams, L. A.....Slayton
‡Wilson, I. H.....Worthington
†Wright, C. O.....Luverne

STEARNS-BENTON COUNTY MEDICAL SOCIETY

Regular meetings, third Thursday of the month
Annual meeting, third Thursday of December
Number of Members: 54

President
DuBois, J. F.....Sauk Center

Secretary
Libert, J. N.....St. Cloud

Barnett, J. M.....Cold Spring
Baumgartner, F. H.....Albany
Beuning, J. B.....St. Cloud
Brigham, C. F.....St. Cloud
Buscher, J. C.....St. Cloud
Clark, H. B.....St. Cloud
Donaldson, C. S.....Foley
DuBois, J. F.....Sauk Center
Engstrom, G. F.....Belgrade
Evans, L. M.....Sauk Rapids
Fleming, T. N.....St. Cloud
Fredlund, M. L.....Minneapolis
Freeman, W. L.....St. Cloud
Friesleben, William.....Sauk Rapids
Gaida, J. B.....St. Cloud
Goehrs, G. H.....St. Cloud
Goehrs, H. W.....St. Cloud
Haberman, Emil.....Osakis
Halenback, P. L.....St. Cloud
†Hemstead, Werner.....Fergus Falls
Henry, C. J.....Milaca
Johnson, Walfred.....Sauk Center
Jones, R. N.....St. Cloud
Keithahn, E. E.....Kimball
‡Kern, M. C.....Freeport
‡Kettlewell, R. B.....Sauk Center
Kohler, D. W.....St. Joseph
Koop, S. H.....Richmond
Kuhlmann, August.....Melrose
Lewis, C. B.....St. Cloud
Libert, J. N.....St. Cloud
Mahowald, A.....Albany
McDowell, J. P.....St. Cloud
Meyer, A. A.....Melrose
Musachio, N. F.....Foley
Myre, C. R.....Paynesville
Nessa, C. B.....St. Cloud
Raetz, S. J.....Maple Lake
Rathbun, C. A.....St. Cloud
Richards, W. B.....St. Cloud
Rumpf, W. H.....St. Cloud
Sandven, N. O.....Paynesville
Schatz, F. J.....St. Cloud
Sherwood, G. E.....Kimball
Stangl, P. E.....St. Cloud
‡Stewart, N. E.
Fort Leonard Wood, Mo.
‡Street, Bernard.....St. Cloud
Sutton, C. S.....St. Cloud
Townsend, De Wayne.....Brooten
Veranth, L. A.....St. Cloud
Walfred, K. A.....St. Cloud
‡Watson, W. J.....Holdingford
Wenner, W. T.....St. Cloud
Zachman, A. H.....Melrose

STEELE COUNTY MEDICAL SOCIETY

Regular meetings, at call
Annual meeting, February
Number of Members: 16

President
Morehead, D. E.....Owatonna

Secretary
Wilkowske, R. J.....Owatonna

Berghs, L. V.....Owatonna
Carlson, V. W.....Blooming Prairie
Dewey, D. H.....Owatonna
Ertel, E. Q.....Ellendale
Hartung, E. H.....Claremont
McEnaney, C. T.....Owatonna
McIntyre, J. A.....Owatonna
Melby, Benedik.....Blooming Prairie
Morehead, D. E.....Owatonna
Nelson, E. J.....Owatonna
Roberts, O. W.....Owatonna
Schaefer, J. F.....Owatonna
Senn, E. W.....Owatonna
Stewart, A. B.....Owatonna
Stransky, T. W.....Owatonna
Wilkowske, R. J.....Owatonna

UPPER MISSISSIPPI MEDICAL SOCIETY

Aitkin, Beltrami, Cass, Clearwater, Crow Wing, Hubbard
Koochiching, Lake of the Woods, Morrison, Todd and Wadena Counties
Regular meetings, Spring, Summer, Fall, Winter
Annual meeting, January
Number of Members: 96

President
Hubin, G. E.....Deerwood

Secretary
Badeaux, G. I.....Brainerd

Adkins, G. H.....Pine River
Badeaux, G. I.....Brainerd
Beise, R. A.....Brainerd
Borgerson, A. H.....Long Prairie
Bosland, H. G.....Verndale
‡Bray, K. E.....Park Rapids
Burns, H. A.....Ah-Gwah-Ching
Cardle, G. E.....Brainerd
Carlson, C. E.....Aitkin
†Christie, G. R.....Long Prairie
Christie, R. L.....Long Prairie
Cook, J. M.....Staples
Coombs, C. H.....Cass Lake
†Corrigan, J. E.....Spooner
Craig, C. C.....International Falls
Davis, L. F.....Wadena
Davis, L. T.....Wadena
Davis, R. D.....Clearbrook
Davis, T. C.....Wadena
‡East, John.....Northome
Eiler, John.....Park Rapids
Eyres, T. E.....Pequot
Fait, R. V.....Little Falls
Fitzsimons, W. E.....Brainerd
Frost, H. T.....Wadena
Garlock, A. V.....Bemidji
Garlock, D. H.....Bemidji
Gerber, M. P.....Brainerd
Ghostley, Mary C.....Puposky
‡Gifford, B. L.....Long Prairie
†Gilmore, Rowland.....Bemidji
Gorenflo, Leila.....Cass Lake
Grogan, J. S.....Wadena
Groschupf, T. P.....Bemidji
Grose, F. N.....Clarissa
Halliday, G. J.....Brainerd
Haller, William.....Bemidji
Hanover, R. D.....Littlefork
Hawkinson, J. P.....Crosby
Healy, R. T.....Pierz
Hiebert, H. L.....Topeka, Kans.
Higgs, W. W.....Park Rapids
House, Z. E.....Cass Lake
Houston, D. M.....Park Rapids
Hubbard, O. E.....Brainerd
Hubin, E. G.....Deerwood
‡Idstrom, L. G.....Minneapolis
*Jacobson, D. J.....Bemidji
Jamieson, E. F.....Brainerd
Johnson, D. L.....Little Falls
Johnson, E. W.....Bemidji
Kerlan, Irvin.....Washington, D. C.
Knights, J. A.....Bemidji
Lamb, H. L.....Little Falls
Larson, L. J.....Bagley
Lee, H. W.....Brainerd
Leemhuis, G. H.....Aitkin
Lenarz, A. J.....Browerville
Lund, W. J.....Staples
‡Mark, Hilbert.....Minneapolis
‡Mason, J. A.....International Falls
McCann, D. F.....Bemidji
Mitby, I. L.....Aitkin
Monahan, R. H...International Falls
Mosby, M. E.....Long Prairie
‡Mulligan, A. M.....Brainerd
‡Murray, R. A.....Aitkin
Nelson, N. P.....Brainerd
Petraborg, H. T.....Aitkin
Pierce, C. H.....Wadena
‡Potek, David.....International Falls
Quanstrom, V. E.....Brainerd
†Ratcliffe, J. J.....Aitkin
Reichelderfer, C. F.....Staples
Ringle, O. F.....Walker
*Roberts, L. M.....Little Falls
Schulze, W. M.....Swanville
Shannon, S. S.....Ironton
Silver, Henry.....Sebeka
Simons, E. J.....Swanville
‡Simons, S. J.....Akeley
Smith, B. A.....Crosby
Stafford, C. E.....Baudette
Stein, R. J.....Pierz
‡Swedenburg, P. A.....Swanville
Thabes, J. A., Jr.....Brainerd
Thabes, J. A., Sr.....Brainerd
Trommald, Gladys, B. K.
Northville, Mich.
Vandersluis, C. W.....Bemidji
Watson, A. M.....Royalton
Watson, P. T.....Cass Lake
Watson, S. W.....Royalton
Whittemore, D. D.....Bemidji
Will, C. B.....Bertha
Will, W. W.....Bertha
Wilson, V. O.....Minneapolis
‡Wingquist, C. G.....Crosby
Withrow, M. E.....International Falls

WABASHA COUNTY MEDICAL SOCIETY

Regular meetings, Spring and Fall
Annual meeting, first Thursday after first Monday in October
Number of Members: 15

President
Glabe, R. A.....Plainview

Secretary
Wilson, W. F.....Lake City

Bayley, E. C.....Lake City
Bouquet, B. J.....Wabasha
Bowers, R. N.....Lake City
†Cochrane, W. J.....Lake City
Collins, J. S.....Wabasha
†Dempsey, D. P.....Kellogg
Ellis, E. W.....Elgin
‡Flesche, B. A.....Lake City
Glabe, R. A.....Plainview
‡Holt, G. W.....Wabasha
Mahle, D. G.....Plainview
Ochsner, C. G.....Wabasha
Replogle, W. H.....Wabasha
*Slocumb, J. A.....Plainview
Wellman, T. G.....Lake City
†Wilson, W. F.....Lake City

WASECA COUNTY MEDICAL SOCIETY

Regular meetings, none
Annual meeting, January
Number of Members: 8

President
Wadd, C. T.....Janesville

Secretary
Olds, G. H.....Waseca

Gallagher, B. J.....Waseca
‡Hottinger, R. C.....Janesville
McIntire, H. M.....Waseca
Oeljen, S. C. G.....Waseca

Olds, G. H.....Waseca
Spittler, R. O.....New Richland
Swenson, O. J.....Waseca
Wadd, C. T.....Janesville

WASHINGTON COUNTY MEDICAL SOCIETY

Regular meetings, second Tuesday in January, February, March, April, May, September, October November and December
Annual meeting second Tuesday in December
Number of Members: 18

President
Johnson, R. G.....Stillwater

Secretary
Boleyn, E. S.....Stillwater

Boleyn, E. S.....Stillwater
Carlson, R. E.....Stillwater

Haines, J. H.....Stillwater
Humphrey, W. R.....Stillwater
Johnson, R. G.....Stillwater
Josewski, R. J.....Stillwater
Kalinoff, D.....Stillwater
McCarten, F. M.....Stillwater
Mingo, F. E.....Hugo
Poirier, J. A.....Forest Lake

Ruggles, G. McC.....Forest Lake
Samson, E. R.....Stillwater
Sherman, C. H.....Stillwater
Strand E. V.....Bayport
Stuhr, J. W.....Stillwater
Thompson, V. C...Marine-on-St. Croix
Van Meier, Henry.....Stillwater
Wilkinson, Stella L.....Newport

WATONWAN COUNTY MEDICAL SOCIETY

Regular meeting, at call
Annual meeting, December
Number of Members: 8

President
Bergman, O. B.....St. James

Secretary
Grimes, H. B.....Madelia

Bergman, O. B.....St. James
Bratrude, E. J.....St. James
Bregel, F. L.....St. James
Grimes, H. B.....Madelia

Hagen, O. E.....Butterfield
Hammar, L. M.....Butterfield
McCarthy, W. J.....Madelia
Thompson, Albert.....St. James

WEST CENTRAL MINNESOTA MEDICAL SOCIETY

Big Stone, Pope, Stevens, and Traverse Counties
Regular meetings, second Wednesday, March, May, October, December
Annual meeting October
Number of Members: 28

President
Behmler, F. W.....Morris

Secretary
Linde, Herman.....Cyrus

Arneson, A. I.....Morris
Behmler, F. W.....Morris
Bergan, Otto.....Clinton
Bolsta, Charles.....Ortonville
Caine, C. E.....Morris

Dahle, M. B.....Glenwood
Doleman, N. F.....Tintah
Eberlin, E. A.....Glenwood
Elsey, E. McC.....Glenwood
Elsey, J. R.....Glenwood
Engdahl, F. W.....Mankato
Ewing, C. F.....Wheaton
Fitzgerald, E. T.....Morris
‡Garrow, D. M.....St. Paul
Giesen, A. F.....Starbuck
Jarvis, B. W.....Lowry
Karn, B. R.....Ortonville

Lindberg, A. L.....Wheaton
Linde, Herman.....Cyrus
Magnuson, A. E.....Graceville
Merrill, Robert.....Morris
McIver, B. A.....Lowry
Mooney, L. P.....Graceville
Muir, W. F.....Graceville
O'Donnell, D. M.....Ortonville
Oliver, C. I.....Graceville
Oliver, I. L.....Graceville
Ransom, M. L.....Hancock

WINONA COUNTY MEDICAL SOCIETY

Regular meetings, first Monday in January, April, July, October
Annual meeting, first Monday in January
Number of Members: 29

President
Loomis, G. L.....Winona

Secretary
Meinert, A. E.....Winona

Benoit, F. T.....Winona
Bruder, V. F. J.....Winona
Christensen, E. E.....Winona
‡Hamlon, J. S.....St. Charles
Heise, Herbert.....Winona
Heise, W. F. C.....Winona

Heise, W. V.....Winona
Keyes, J. D.....Winona
Lindsay, W. V.....Winona
Loomis, G. L.....Winona
Lundquist, C. W.....Winona
Mattison, P. A.....Winona
McLaughlin, E. M.....Winona
Meinert, A. E.....Winona
‡Meyer, W. M.....Winona
Neumann, C. A.....Winona
Page, R. L.....St. Charles
Risser, E. D.....Winona

Robbins, C. P.....Winona
Roemer, H. J.....Winona
Roth, F. D.....Lewiston
Satterlee, H. W.....Lewiston
Schaefer, Samuel.....Winona
Steiner, I. W.....Winona
Tweedy, G. J.....Winona
Tweedy, R. B.....Winona
Walker, G. H.....Winona
Wilson, R. H.....Winona
Younger, L. I.....Winona

WRIGHT COUNTY MEDICAL SOCIETY

Regular meetings, quarterly
Annual meeting, second Monday in October
Number of Members: 19

President
Peterson, O. L.....Cokato

Secretary
Catlin, J. J.....Buffalo

Anderson, W. P.....Buffalo
Bendix, L. H.....Annandale
Catlin, J. J.....Buffalo

Catlin, T. J.....Buffalo
Ellison, F. E.....Monticello
Greenfield, W. T.....Delano
Grundset, O. J.....Montrose
Guilfoile, P. J.....Delano
Hansen, Rorbye.....Monticello
Harriman, L.....Howard Lake
Hart, W. E.....Monticello

Lee, J. L.....Watertown
Peterson, O. L.....Cokato
Phillips, A. E.....Delano
Ridgway, A. M.....Annandale
Roholt, C. L.....Waverly
Rolig, D. H.....Howard Lake
Thielen, R. D.....St. Michael
Thompson, Arthur.....Cokato

ALPHABETIC ROSTER

Key to Symbols: *Deceased; †Affiliate or Associate; ‡In Service

Aagaard, G. N., Jr.....Minneapolis
Aanes, A. M.....Red Wing
Abbott, C. B.....Springfield
Abbott, J. S.....St. Paul
†Aborn, W. H.....Hawley
Abraham, A. L.....Duluth
Abramson, Milton.....Minneapolis
‡Adair, A. F., Jr.....St. Paul
Adams, B. S.....Hibbing
Adams, J. M.....Minneapolis
Adams, R. C.....Bird Island
Adams, R. C.....Rochester
Addy, E. R.....Gilbert
Adkins, C. M.....Thief River Falls
Adkins, G. H.....Pine River
Adson, A. W.....Rochester
Affeldt, D. E.....Kasson
Ahl, C. W.....Hibbing
Ahlfs, J. J.....Caledonia
Ahrens, A. E.....St. Paul
Ahrens, A. H.....St. Paul
Aita, J. A.....Rochester
Aitkens, H. B.....Le Center
Akins, W. M.....Eveleth
Albers, G. D.....Rochester
Alberts, M. W.....St. Paul
Alden, J. F.....St. Paul
Alexander, F. H.....St. Paul
Alexander, H. A.....Minneapolis
Aling, C. A.....Minneapolis
Aling, C. P.....Minneapolis
Allen, C. C.....Austin
Allen, E. V. N.....Rochester
Allen, H. W.....Minneapolis
Allen, H. B.....Austin
Allison, R. G.....Minneapolis
Altnow, H. O.....Minneapolis
Alvarez, W. C.....Rochester
Amberg, Samuel.....Rochester
Ambrusko, J. S.....Rochester
Andersen, A. G.....Minneapolis
Andersen, S. C.....Minneapolis
‡Anderson, B. M.....Rochester
Anderson, C. D.....Rochester
‡Anderson, C. L.....Duluth
Anderson, D. D.....Minneapolis
Anderson, D. P., Jr.....Austin
‡Anderson, E. D.....Minneapolis
Anderson, E. M.....Rochester
Anderson, E. M.....Lamberton
Anderson, E. R.....Minneapolis
Anderson, F. J.....Minneapolis
Anderson, H. R.....Deer River
Anderson, J. K.....Minneapolis
Anderson, K. W.....Minneapolis
Anderson, M. J.....Rochester
Anderson, O. W.....Luverne
Anderson, P. A.....Minneapolis
Anderson, R. E.....Willmar
Anderson, S. H.....Red Wing
Anderson, U. S.....Minneapolis
‡Anderson, W. E...Thief River Falls
Anderson, W. P.....Buffalo
Anderson, W. S.....Minneapolis
‡Andreassen, E. C.....Minneapolis
Andresen, K. D.....Minneapolis
Andrews, R. N.....Mankato
Andrews, R. S.....Minneapolis
Andrus, F. C.....Minneapolis
Annis, H. B.....Minneapolis
Arends, A. L.....Cambridge
Arey, S. L.....Excelsior
Arko, J. L.....Chisholm
Arlander, C. E.....Minneapolis
Arling, L. S.....Minneapolis
Armstrong, E. L.....Duluth
†Armstrong, J. M.....St. Paul
Arndt, H. W.....Detroit Lakes
Arneson, A. I.....Morris
Arnold, Anna W.....Minneapolis
Arnold, D. C.....Minneapolis
Arnold, E. W.....Adrian
Arnquist, A. S.....St. Paul
Arnson, J. M.....Benson
Arny, F. P.....Preston
Arvidson, C. G.....Minneapolis
Ashburn, F. S.....Rochester
Athens, A. G.....Duluth
Aune, Martin.....Minneapolis
Aurand, W. H.....Minneapolis
Aurelius, J. R.....St. Paul
Ausman, C. F.....St. Paul
Ayres, G. T.....Ely

Babb, F. S.....Rochester
Babcock, F. M.....Northfield
Bacon, D. K.....St. Paul
†Bacon, L. C.....St. Paul
Badeaux, G. I.....Brainerd
‡Baggenstoss, A. H.....Rochester
Bagley, C. M.....Duluth
Bagley, Elizabeth C.....Duluth
Bagley, W. R.....Duluth
Bailey, H. B.....Fairmont
Bailey, R. B.....Fairmont
Bair, H. L.....Rochester
Baken, M. P.....Minneapolis
Baker, A. B.....Minneapolis
Baker, A. C.....Fergus Falls
Baker, A. T.....Minneapolis
Baker, E. L.....Minneapolis
Baker, G. S.....Rochester
Baker, H. R.....Hayfield
Baker, Looe.....Minneapolis
Baker, N. H.....Fergus Falls
Baker, R. L.....Hayfield
Bakkila, H. E.....Duluth
Balcome, M. M.....St. Paul
Baldigo, E. M.....Red Wing
Balfour, D. C.....Rochester
‡Balkin, S. G.....Minneapolis
Balmer, A. I.....Pipestone
†Barber, J. P.....Minneapolis
Bardon, Richard.....Duluth
Bargen, J. A.....Rochester
Barker, N. W.....Rochester
Barnes, A. R.....Rochester
Barnes, R. G., Jr.....Hastings
Barnett, J. M.....Cold Spring
Barney, L. A.....Duluth
Barr, L. C.....Albert Lea
‡Barr, R. N.....St. Paul
Barr, W. H.....Wells
Barrett, E. E.....Duluth
Barron, Moses.....Minneapolis
Barry, L. W.....St. Paul
Barsness, Nellie O. N.....St. Paul
Basinger, H. P.....Windom
Basinger, H. R.....Mountain Lake
Bass, G. W.....Minneapolis
Baumgartner, F. H.....Albany
Baxter, S. H.....Minneapolis
Bayard, H. F.....Minneapolis
Bayley, E. C.....Lake City
Beals, Hugh.....St. Paul
†Beard, A. H.....Minneapolis
Beard, Crowell.....Rochester
Becker, F. T.....Duluth
Beckering, Gerrit.....Edgerton
‡Beckjord, P. R.....Willmar
Beckman, W. G.....Minneapolis
Bedford, E. W.....Minneapolis
Beech, R. H.....St. Paul
Beede, Ethel R.....Faribault
‡Beek, H. O.....St. Paul
Behmler, F. W.....Morris
Behr, O. K.....Crookston
Beise, R. A.....Brainerd
Beizer, L. H.....Rochester
Bell, C. C.....St. Paul
†Bell, E. T.....Minneapolis
Belote, G. B.....Caledonia
‡Belzer, M. S.....Minneapolis
Bender, J. H.....Big Fork
Bendix, L. H.....Annandale
Benedict, W. L.....Rochester
Benepe, J. L.....St. Paul
Benesh, L. A.....Minneapolis
Benesh, N. G.....Minneapolis
Benham, E. W.....Mankato
Benjamin, A. E.....Minneapolis
‡Benjamin, E. G.....Minneapolis
‡Benjamin, H. G.....Minneapolis
Benjamin, W. G.....Pipestone
Benn, F. G.....Minneapolis
Bennett, J. K.....Rochester
Bennett, W. A.....Rochester
Bennion, P. H.....St. Paul
Benoit, F. T.....Winona
Benson, R. E.....Rochester
Bentley, N. P.....St. Paul
Benton, P. C.....Gibbon
Bepko, Marie K.....Cloquet
Berdez, G. L.....Duluth
Bergan, Otto.....Clinton
Berge, D. O.....Roseau
Bergen, C. T.....Bricelyn
Berger, A. G.....Minneapolis
‡Bergh, G. S.....Minneapolis
Bergh, L. N.....Montevideo
Berghs, L. V.....Owatonna
Bergman, O. B.....St. James
Bergquist, K. E.....Battle Lake
Berkman, D. M.....Rochester
Berkman, J. M.....Rochester
Berkwitz, N. J.....Minneapolis
Berlin, A. S.....Hallock
‡Berman, Reuben.....Minneapolis
Bernstein, W. C.....St. Paul
Bertelson, O. L.....Crookston
Bessesen, A. N., Jr.....Minneapolis
Bessesen, D. H.....Minneapolis
Bessesen, W. A.....Minneapolis
Beuning, J. B.....St. Cloud
Bianco, A. J.....Duluth
Bicek, J. F.....St. Paul
Bickel, W. H.....Rochester
Biedermann, Jacob..Thief River Falls
Bigelow, C. E.....Dodge Center
Billings, R. E.....Franklin
Binet, H. E.....Grand Rapids
Binger, H. E.....St. Paul
Binger, M. W.....Rochester
Birnberg, T. L.....St. Paul
Black, B. M.....Rochester
Black, William.....Mankato
Blackwell, W. J.....Rochester
Blaisdell, J. S.....Rochester
Blake, James.....Hopkins
Blake, James A.....Hopkins
Blakely, C. C.....Barnum
Blakey, A. R.....Osakis
Blanchard, H. G.....Fairmont
*Blegen, H. M.....Warren
Blomberg, W. R.....Princeton
Blumenthal, J. S....Columbia Heights
Blumstein, Alex.....Minneapolis
Boardman, D. V.....Twin Valley
Bock, R. A.....St. Paul
Bockman, M. W. H.....Minneapolis
Bodaski, A. A.....Montgomery
Boeckmann, Egil.....St. Paul
Boehme, E. J.....Minneapolis
Boehrer, J. J.....Minneapolis
Bofenkamp, F. W.....Luverne
Bohl, G. W.....Ada
Boies, L. R.....Minneapolis
Bolender, H. L.....St. Paul
Boleyn, E. S.....Stillwater
Boline, C. A.....Battle Lake
Bolsta, Charles.....Ortonville
Boman, P. G.....Duluth
*Bong, J. H.....Jasper
Boody, G. J., Jr.....Dawson
Booth, A. E.....Minneapolis
Boothby, W. M.....Rochester
Boreen, C. A.....Minneapolis
‡Borg, J. F.....St. Paul
Borgerson, A. H.....Long Prairie
Borgeson, E. J.....Minneapolis
Borman, C. N.....Minneapolis
Bosland, H. G.....Verndale
Bossert, C. S.....Mora
Bossingham, O. N.....Lake Benton
Bottolfson, B. T.....Moorhead
Bouma, L. R.....St. Paul
†Bouman, H. A. H.....Minneapolis
Bouquet, B. J.....Wabasha
Bowen, R. L.....Hibbing
Bowers, R. N.....Lake City
Bowing, H. H.....Rochester
Boyd, L. M.....Alexandria
Boyer, S. H.....Duluth
Boyer, S. H., Jr.....Duluth
Boynton, Ruth E.....Minneapolis
Boysen, Herbert.....Madelia
‡Boysen, J. E.....Pelican Rapids
Boysen, Peter.....Pelican Rapids
Braasch, W. F.....Rochester
Bradshaw, S. P.....Rochester
Brand, G. D.....St. Paul
Brand, W. A.....Redwood Falls
‡Branham, D. S.....Albert Lea
Branton, A. F.....Willmar
Branton, B. J.....Willmar
Bratrud, A. F.....Minneapolis
Bratrud, Edward....Thief River Falls
Bratrude, E. J.....St. James
Braun, O. C.....Nashwauk
Braverman, N. J.....Duluth
Bray, E. R.....St. Paul
‡Bray, K. E.....Park Rapids
Bray, P. N.....Duluth
Bray, R. B.....Biwabik
Bregel, F. L.....St. James
Brekke, H. J.....Minneapolis
Breslow, Lester.....Rochester
Briggs, J. F.....St. Paul
Brigham, C. F.....St. Cloud
Brigham, F. T.....Watkins
Brindley, George V., Jr.....Rochester
Brink, A. A.....Baudette

Brink, D. M.....New York, N. Y.
Broadie, T. E.....St. Paul
Broders, A. C.....Rochester
Brodie, W. D.....St. Paul
Broker, W. S.....Wadena
Brooks, S. M.....Rochester
Brown, A. E.....Rochester
Brown, A. H.....Pipestone
†Brown, E. D.....Paynesville
†Brown, E. I.....St. Paul
Brown, G. E., Jr.....Pine City
Brown, H. A.....Rochester
Brown, J. C.....St. Paul
Brown, J. R.....Rochester
Brown, L. L.....Crookston
Brown, M. H.....Rochester
Brown, P. W.....Rochester
Browne, H. C., Jr.....Rochester
Brownstone, Manuel.....Sandstone
Bruder, V. F. J.....Winona
Brunsting, L. A.....Rochester
Brusegard, J. F.....Red Wing
Brutsch, G. C.....Minneapolis
Bryant, F. L.....Minneapolis
Bryson, J. C.....Rochester
‡Buchstein, H. F.....Minneapolis
Buck, F. H.....Shakopee
Buck, R. M.....Rochester
Buckley, R. P.....Duluth
Buie, L. A.....Rochester
‡Bulinski, T. J.....St. Paul
Bulkley, Kenneth.....Minneapolis
Bunker, B. W.....Anoka
‡Burch, E. P.....St. Paul
Burch, F. E.....St. Paul
Burchell, H. B.....Rochester
Burdon, Phyllis J.....Rochester
Burkhart, R. J.....Rochester
Burlingame, D. A.....Minneapolis
Burnap, W. L.....Fergus Falls
Burns, F. M.....Milan
Burns, H. A.....Ah-Gwah-Ching
Burns, L. S.....So. St. Paul
Burns, M. A.....Milan
Burns, R. M.....St. Paul
Burton, C. G.....St. Paul
Buscher, J. C.....St. Cloud
Bushard, W. J.....Bird Island
Busher, H. H.....St. Paul
Butler, John.....Minneapolis
Butler, J. K.....Carlton
Butt, H. R.....Rochester
Butturff, C. R.....Freeborn
Butzer, J. A.....Mankato
Buzzelle, L. K.....Minneapolis

Cable, M. L.....Minneapolis
Cabot, V. S.....Minneapolis
Cady, L. H.....Minneapolis
Cain, C. L.....St. Paul
Caine, C. E.....Morris
Cairns, R. J.....Sanborn
Caldwell, H. W.....Rochester
Caldwell, J. P.....St. Paul
Calhoun, F. W.....Albert Lea
Call, J. D.....Rochester
Callahan, F. F.....Pokegama
Callerstrom, G. W.....Minneapolis
Cameron, Isabell L.....Minneapolis
Cameron, J. H.....Erskine
Camp, J. D.....Rochester
Camp, W. E.....Minneapolis
Campbell, C. M., Jr.....Rochester
Campbell, D. C.....Rochester
Campbell, J. R.....Rochester
Campbell, O. J.....Minneapolis
Canfield, W. W.....Houston
Cantwell, W. F.....International Falls
Cardle, A. E.....Minneapolis
Cardle, G. E.....Brainerd
Carey, J. B.....Minneapolis
Carlson, C. E.....Aitkin
Carlson, R. E.....Stillwater
Carlson, J. V.....Westbrook
Carlson, Lawrence.....Minneapolis
Carlson, L. T.....Minneapolis
Carlson, V. W.....Blooming Prairie
Carman, J. E.....Detroit Lakes
Caron, R. P.....Minneapolis
Carroll, W. C.....St. Paul
Carryer, H. M.....Rochester
Carstens, C. F.....Hibbing
‡Caspers, C. G.....Minneapolis
Catlin, J. J.....Buffalo
Catlin, T. J.....Buffalo
‡Cavanor, F. T.....Minneapolis
‡Ceplecha, S. F.....Redwood Falls
Cervenka, C. F.....New Prague
†Chadbourn, A. G.....Heron Lake
Chadbourn, C. R.....St. Paul
‡Challman, S. A.....Minneapolis
Chambers, W. C.....Blue Earth
Chapman, A. S.....Rochester
Chapman, T. L.....Duluth
Chatterton, C. C.....St. Paul
†Cheney, E. L.....Duluth
Chermak, F. G.....International Falls
Chesley, A. J.....St. Paul
Chesley, Ward B.....Virginia
Christensen, B. H.....Rochester
Christensen, C. H.....Duluth
Christensen, E. E.....Winona
Christensen, E. P.....Two Harbors
Christenson, G. R.....Minneapolis
Christiansen, Andrew.....St. Paul
Christianson, H. W.....Minneapolis
†Christie, G. R.....Long Prairie
Christie, R. L.....Long Prairie
†Christison, J. T.....St. Paul
Chunn, S. S.....Pipestone
Clagett, O. T.....Rochester
Clapp, Stewart.....Duluth
Clark, F. F.....Duluth
Clark, H. B.....St. Cloud
‡Clark, H. B., Jr.....St. Paul
†Clark, H. S.....Minneapolis
Clark, L. W.....Spring Valley
†Clark, T. C.....Arlington, Va.
Clarke, E. K.....St. Paul
Clarke, E. T.....Rochester
Clay, L. B.....Minneapolis
*Claydon, D. R.....Red Wing
Claydon, L. E.....Red Wing
Clegg, R. S.....Duluth
Clement, J. B.....Lester Prairie
‡Clement, T. G.....Duluth
Clifford, G. W.....Alexandria
Clifton, T. A.....Chatfield
‡Cochrane, B. B.....St. Paul
Cochrane, R. F.....Minneapolis
†Cochrane, W. J.....Lake City
‡Coddon, W. D.....St. Paul
Cohen, S. S.....Oak Terrace
Colby, W. L.....St. Paul
*Cole, H. B.....Redwood Falls
Cole, J. G.....Redwood Falls
Cole, W. H.....St. Paul
†Collie, H. G.....St. Paul
Collins, A. N.....Duluth
†Collins, H. C.....Duluth
Collins, J. S.....Wabasha
Colp, E. A.....Robbinsdale
Colvin, A. R.....St. Paul
Combacker, L. C.....Fergus Falls
Comfort, M. W.....Rochester
Condit, W. H.....Minneapolis
Condon, W. B.....Rochester
†Conner, H. M.....Rochester
Connor, C. E.....St. Paul
Cook, C. K.....St. Paul
Cook, E. N.....Rochester
Cook, J. M.....Staples
Coombs, C. H.....Cass Lake
Cooney, H. C.....Princeton
Cooper, C. C.....St. Paul
Cooper, M. D.....Winnebago
Cooper, Talbert.....Rochester
Cooperman, H. O.....Minneapolis
Corbett, J. F.....Minneapolis
Corbitt, R. W.....Rochester
Corniea, A. D.....Minneapolis
†Corrigan, J. E.....Spooner
Cosgriff, J. A.....Olivia
Counseller, V. S.....Rochester
Countryman, R. S.....St. Paul
Covell, W. W.....St. Peter
Coventry, M. B.....Rochester
Coventry, W. A.....Duluth
Coventry, W. D.....Duluth
Cowern, E. W.....Seattle, Wash.
Cragg, R. W.....Rochester
Craig, C. C.....International Falls
Craig, W. McK.....Rochester
Cranmer, R. R.....Minneapolis
Cranston, R. W.....Minneapolis
Creevy, C. D.....Minneapolis
‡Creighton, R. H.....Minneapolis
Crenshaw, J. L.....Rochester
Cress, P. J.....Ellsworth
Crewe, J. E.....Rochester
Critchfield, L. R.....St. Paul
Crombie, F. J.....North St. Paul
Cronwell, B. J.....Austin
Crow, E. R.....Arlington
Culligan, J. M.....St. Paul
Cumming, H. A.....Minneapolis
Cummings, D. W.....Rushford
Cunningham, B. P.....Rochester
Cunningham, C. B.....Virginia
Currens, J. H.....Rochester
Curtin, J. F.....Minneapolis
Curtis, R. A.....Le Center
Cusick, P. L.....Rochester
Cutts, George.....Minneapolis

Dack, L. G.....St. Paul
Dady, E. E.....Minneapolis
Dahl, E. O.....Minneapolis
Dahl, G. A.....Mankato
Dahl, J. A.....Minneapolis
Dahle, M. B.....Glenwood
Daignault, Oscar.....Benson
Daniel, D. H.....Minneapolis
Daniel, L. M.....Minneapolis
Danielson, K. A.....Litchfield
Danielson, Lennox.....Litchfield
Darling, J. P.....Rochester
†Daugherty, E. B..Marine-on-St. Croix
Daugherty, G. W.....Rochester
Daugherty, L. E.....St. Paul
Davies, L. T.....Rochester
Davies, R. J.....Nopeming
Davis, A. C.....Rochester
†Davis, Herbert.....St. Paul
Davis, I. G.....Rushford
Davis, J. C.....Minneapolis
Davis, L. F.....Wadena
Davis, L. T.....Wadena
Davis, R. D.....Clearbrook
Davis, T. C.....Wadena
†Davis, William.....St. Paul
Day, Lois A.....Rochester
Dearing, W. H., Jr.....Rochester
De Boer, Hermanus.....Edgerton
DeCourcey, D. M.....St. Paul
Dedolph, Karl.....St. Paul
†Dedolph, T. H.....Braham
Delavan, P. A.....St. Paul
Delmore, J. L., Jr.....Roseau
Delmore, J. L.....Roseau
del Plaine, C. W.....Minneapolis
Demo, P. W.....Wells
Demong, C. V.....Rochester
†Dempsey, D. P.....Kellogg
Denman, A. V.....Mankato
Derauf, B. I.....St. Paul
Derifield, R. S.....Crookston
Desjardins, A. U.....Rochester
Devereaux, T. J.....Wayzata
Dewey, D. H.....Owatonna
Dickson, T. H.....St. Paul
Diehl, H. S.....Minneapolis
Diessner, H. D.....Minneapolis
Dippel, A. L.....Minneapolis
Dittman, G. C.....St. Paul
Dix, C. R.....Rochester
Dixon, C. F.....Rochester
Dobyns, B. M.....Rochester
Dockerty, M. B.....Rochester
*Doering, R. E.....Minneapolis
Dolder, F. C.....Eyota
Doleman, N. F.....Tintah
Doman, V. W.....Lakefield
Doms, H. C. A.....Slayton
Donald, C. J., Jr.....Rochester
Donaldson, C. S.....Foley
Donohue, P. F.....St. Paul
Donovan, D. L.....Albert Lea
Doolittle, L. E.....Duluth
Dordal, John.....Sacred Heart
Dorge, R. I.....Minneapolis
Dornblaser, H. B.....Minneapolis
Dorsey, G. C.....Minneapolis
Dovre, C. M.....St. Paul
Dowidat, R. W.....Minneapolis
Downing, G. C.....Rochester
Dowswell, W. J.....Kerkhoven
Doxey, G. L.....Minneapolis
Doyle, G. C.....Duluth
Doyle, L. O.....Minneapolis
Drake, C. B.....St. Paul
Drake, C. R.....Minneapolis
†Drake, F. A.....Lanesboro
Drapiewski, J. F.....Rochester
Dredge, H. P.....Sandstone
Drill, H. E.....Hopkins
Drips, Della G.....Rochester
Drought, W. W.....Fergus Falls
Dry, T. J.....Rochester
Dubbe, F. H.....New Ulm
Du Bois, J. F.....Sauk Centre
Duff, E. R.....Minneapolis
Dugan, L. F.....Faribault
Dukelow, D. A.....Minneapolis
Dumas, A. G.....Minneapolis
Duncan, J. W.....Moorhead
Dungay, N. S.....Northfield
Dunlap, D. L.....Rochester
Dunlap, E. H.....Minneapolis
Dunn, G. R.....Minneapolis
Dunn, J. N.....St. Paul
Duryea, W. M.....Minneapolis
†Dutton, C. E.....Minneapolis
Dvorak, B. A.....Minneapolis
Dwan, P. F.....Minneapolis
‡Dworak, A. F.....St. Paul
Dworsky, S. D.....Minneapolis
‡Dysterheft, A. F.....Gaylord

Earl, George ..... St. Paul
Earl, J. R. ..... St. Paul
Earl, Robert ..... St. Paul
‡East, John ..... Northome
Eaton, L. M. ..... Rochester
Eaves, G. B. ..... Wabasso
Eberlin, E. A. ..... Glenwood
Eckdale, J. E. ..... Lyle
Eckhardt, C. L. ..... Austin
Eckman, P. F. ..... Duluth
Eckman, R. J. ..... Duluth
Ederer, J. J. ..... Mahnomen
Edlund, Gustaf ..... St. Paul
Edwards, J. W. ..... St. Paul
Edwards, R. T. ..... Elysian
Edwards, T. J. ..... St. Paul
Egan, Sherman ..... Rochester
Eginton, C. T. ..... Rochester
Ehni, G. J. ..... Rochester
Ehrenberg, C. J. ..... Minneapolis
Ehrlich, S. P. ..... Minneapolis
Eich, Matthew ..... Minneapolis
Eiler, John ..... Park Rapids
Eisenstadt, D. H. ..... Minneapolis
Eisenstadt, W. S. ..... Minneapolis
Eitel, G. D. ..... Minneapolis
Ekblad, J. W. ..... Duluth
Eklund, E. J. ..... Norwood
Elias, F. J. ..... Duluth
Elkins, E. C. ..... Rochester
Ellingson, A. R. ..... Detroit Lakes
Elliott, W. S. ..... Virginia
Ellis, E. W. ..... Elgin
Ellison, D. E. ..... Minneapolis
Ellison, F. E. ..... Monticello
Elsey, E. M. ..... Glenwood
Elsey, J. R. ..... Glenwood
Ely, O. S. ..... So. St. Paul
Emanuel, K. W. ..... Duluth
Emerson, E. C. ..... St. Paul
Emerson, G. F. ..... Rochester
Emmerson, W. S. ..... Mayer
Emmett, J. L. ..... Rochester
Emond, A. J. ..... Farmington
Endress, E. K. ..... St. Paul
Engberg, E. J. ..... Faribault
Engdahl, F. W. ..... Mankato
Englehart, P. C. ..... Minneapolis
English, J. P. ..... Rochester
Engstrand, O. J. ..... Minneapolis
Engstrom, G. F. ..... Belgrade
Enroth, O. E. ..... White Bear Lake
Eppard, R. M. ..... Cloquet
Erich, J. B. ..... Rochester
‡Erickson, A. O. ..... Ivanhoe
Erickson, C. O. ..... Rochester
Erickson, Eskil ..... Halstad
Erickson, E. W. ..... Rochester
Erickson, R. E. ..... Hector
‡Erickson, R. F. ..... Minneapolis
Ericson, R. M. ..... Minneapolis
Ericson, Swan ..... Le Sueur
Ernest, G. C. H. ..... So. St. Paul
Erskine, G. M. ..... Grand Rapids
Ertel, E. O. ..... Ellendale
†Eshelby, E. C. ..... St. Paul
Esser, John ..... Perham
Esser, O. J. ..... New Ulm
Estrem, C. O. ..... Fergus Falls
Estrem, T. A. ..... Hibbing
Eusterman, G. B. ..... Rochester
Evans, C. H., Jr. ..... Rochester
‡Evans, E. T. ..... Minneapolis
Evans, L. M. ..... Sauk Rapids
Evans, R. D. ..... Minneapolis
†Evarts, A. B. ..... Rochester
Ewens, H. B. ..... Virginia
Ewing, C. F. ..... Wheaton
Eyres, T. E. ..... Pequot

Faber, J. E. ..... Rochester
Fahey, E. W. ..... St. Paul
Fahlund, G. T. R. ..... Rochester
Fahr, G. E. ..... Minneapolis
Fait, R. V. ..... Little Falls
Fankboner, A. V. ..... Buhl
Fansler, W. A. ..... Minneapolis
Farrish, R. C. ..... Sherburn
‡Farsht, I. J. ..... Minneapolis
Fawcett, A. M. ..... Renville
Fawcett, K. R. ..... Duluth
Fawcett, R. M. ..... Rochester
Feeney, J. M. ..... Minneapolis
Feinstein, J. Y. ..... Grove City
Feldman, F. M. ..... Rochester
‡Fellows, M. F. ..... Duluth
Fenger, E. P. K. ..... Oak Terrace
Fenstermacher, R. H. ..... Rochester
Ferguson, F. F. ..... Detroit, Mich.
Ferguson, J. C. ..... St. Paul
Ferguson, W. C. ..... Grove City
‡Ferguson, W. J., Jr. ..... Rochester
Ferris, D. O. ..... Rochester

Fesenmaier, O. B. ..... New Ulm
Fesler, H. H. ..... St. Paul
Fetterly, Warren ..... Minneapolis
Feuling, J. C. ..... Bovey
Field, A. H. ..... Farmington
Figi, F. A. ..... Rochester
Fink, L. W. ..... Minneapolis
Fink, W. H. ..... Minneapolis
Fisch, H. M. ..... Austin
Fischer, M. McC. ..... Duluth
Fisher, I. I. ..... Ceylon
Fiskett, Henry ..... Duluth
†Fitzgerald, D. F. ..... Minneapolis
Fitzgerald, E. T. ..... Morris
Fitzsimons, W. E. ..... Brainerd
Fjeldstad, C. A. ..... Minneapolis
Flanagan, H. F. ..... St. Paul
Flanagan, L. G. ..... Austin
Fleming, A. S. ..... Minneapolis
Fleming, T. N. ..... St. Cloud
‡Flesche, B. A. ..... Lake City
Flinn, J. H. ..... Rochester
Flinn, T. E. ..... Redwood Falls
Flom, M. G. ..... Zumbrota
Fogarty, C. W., Jr. ..... Rochester
Fogarty, C. W. ..... St. Paul
Fogelberg, E. J. ..... St. Paul
Foker, L. W. ..... Minneapolis
Foley, F. E. B. ..... St. Paul
Folken, F. G. ..... Albert Lea
Forbes, R. S. ..... Duluth
Ford, B. C. ..... Marshall
Ford, W. H. ..... Minneapolis
Forney, R. A. ..... Rochester
Foshager, H. T. ..... Clara City
Foss, E. L. ..... Rochester
Foster, M. A. ..... Rochester
Foster, T. N. ..... Rochester
Foster, W. K. ..... Minneapolis
‡Fowler, L. H. ..... Minneapolis
Franchere, F. W. ..... Lake Crystal
Francis, D. W. ..... Morristown
Frane, D. B. ..... Minneapolis
Frank, J. E. ..... Marshall
Fredericks, G. M. ..... Minneapolis
Frederickson, Alice C. ..... Willmar
Frederickson, G. U. Y. ..... Willmar
Fredlund, M. L. ..... Minneapolis
Freeman, C. D. ..... St. Paul
Freeman, G. H. ..... St. Peter
Freeman, J. P. ..... Albert Lea
Freeman, W. L. ..... St. Cloud
Freeman, W. N. ..... Perham
Friedman, L. L. ..... St. Paul
Freligh, W. P. ..... Albert Lea
Fricke, R. E. ..... Rochester
Friedell, Aaron ..... Minneapolis
Friedell, George ..... Ivanhoe
Friesleben, William ..... Sauk Rapids
Frisch, F. P. ..... Willmar
Fritsche, Albert ..... New Ulm
Fritsche, C. J. ..... New Ulm
Fritsche, T. R. ..... New Ulm
Fritz, W. L. ..... St. Paul
‡Fritzell, K. E. ..... Minneapolis
Froats, C. W. ..... St. Paul
Frost, E. H. ..... Willmar
Frost, H. T. ..... Wadena
Frost, J. B. ..... Minneapolis
Fugina, G. R. ..... Mankato
Fuller, Alice H. ..... Minneapolis
‡Funk, V. K. ..... Oak Terrace

Gaarde, F. W. ..... Rochester
Gager, E. C. ..... St. Paul
Gaida, J. B. ..... St. Cloud
Gaines, E. C. ..... Buffalo Lake
Gallagher, B. J. ..... Waseca
‡Galloway, J. B. ..... Minneapolis
Gambill, E. E. ..... Rochester
Gamble, J. W. ..... Albert Lea
Gamble, P. M. ..... Albert Lea
Gammell, J. H. ..... Minneapolis
Garbrecht, A. W. ..... St. Paul
Gardinet, D. G. ..... St. Paul
Gardner, E. L. ..... Minneapolis
Gardner, V. H. ..... Fairmont
Gardner, W. P. ..... Anoka
Garlock, A. V. ..... Bemidji
Garlock, D. H. ..... Bemidji
‡Garrow, D. M. ..... St. Paul
Garten, J. L. ..... Minneapolis
Gaviser, David ..... Princeton
Geer, E. K. ..... St. Paul
Gehlen, J. N. ..... St. Paul
Geist, G. A. ..... St. Paul
Gelbach, P. D. ..... Rochester
Gendron, J. F. X. ..... Grand Rapids
Gerber, M. P. ..... Brainerd
Germo, Charles ..... Balaton
Ghent, C. H. ..... St. Paul
Ghormley, R. K. ..... Rochester
Ghostley, Mary C. ..... Puposky

Gibbons, F. C. ..... Comfrey
Gibbs, E. C. ..... St. Paul
*Giere, E. O. ..... Minneapolis
Giere, J. C. ..... Minneapolis
Giere, R. W. ..... Minneapolis
Giere, S. W. ..... Benson
Giesen, A. F. ..... Starbuck
†Giessler, P. W. ..... Minneapolis
Giffin, H. M. ..... Rochester
Giffin, H. Z. ..... Rochester
‡Gifford, B. L. ..... Long Prairie
Gilbert, M. G. ..... Minneapolis
†Gilfillan, J. S. ..... St. Paul
Gilkey, S. E. ..... St. Paul
Gilles, F. L. ..... Minneapolis
Gillespie, D. R. ..... Rochester
Gillespie, M. G. ..... Duluth
*Gillespie, N. H. ..... Duluth
‡Gilman, L. C. ..... Starbuck
†Gilmore, Rowland ..... Bemidji
Gingold, B. A. ..... Minneapolis
Ginsberg, William ..... St. Paul
Girvin, R. B. ..... Minneapolis
Glabe, R. A. ..... Plainview
Glomset, D. A. ..... Rochester
Glover, R. P. ..... Rochester
Goblirsch, A. P. ..... Sleepy Eye
Goehrs, G. H. ..... St. Cloud
Goehrs, H. W. ..... St. Cloud
Golberg, M. L. ..... Minneapolis
Goldberg, I. M. ..... Minneapolis
Goldish, D. R. ..... Duluth
Goldman, T. I. ..... Minneapolis
‡Goldner, M. Z. ..... Minneapolis
Goltz, E. V. ..... St. Paul
Good, C. A., Jr. ..... Rochester
Good, H. D. ..... Minneapolis
Goodman, C. E. ..... Virginia
Gordon, P. E. ..... Minneapolis
Gore, H. R. ..... Rochester
Gorenflo, Leila A. ..... Cass Lake
Gorsuch, M. T. ..... Rochester
Goss, H. C. ..... Glencoe
Gosslee, G. L. ..... Moorhead
‡Gowan, J. R. ..... Duluth
‡Grabow, J. ..... Duluth
Graham, F. M. ..... Rochester
*Graham, Robert ..... Duluth
Grahek, J. P. ..... Ely
Grandy, A. Margaret ..... Rochester
Grant, H. W. ..... St. Paul
†Gratzek, F. R. ..... Minneapolis
Gratzek, Thomas ..... St. Paul
Grau, R. K. ..... St. Paul
Grave, Floyd ..... Minneapolis
Graves, R. B. ..... Red Wing
Graves, W. N. ..... Duluth
Gray, F. D. ..... Marshall
‡Gray, H. K. ..... Rochester
Gray, R. C. ..... Cambridge
Gray, R. F. ..... Marshall
Green, R. G. ..... Minneapolis
Greene, L. F. ..... Rochester
Greenfield, W. T. ..... Delano
Griffin, P. J. ..... Fertile
‡Grimes, B. P. ..... St. Peter
Grimes, H. B. ..... Madelia
Grimes, Marian ..... Minneapolis
Grinnell, W. B. ..... Preston
Grise, W. B. ..... Austin
Griswold, F. E. ..... Hoffman
Grogan, J. S. ..... Wadena
Gronvall, P. R. ..... Minneapolis
Groschupf, T. P. E. ..... Bemidji
Grose, F. N. ..... Clarissa
Gruenhagen, A. P. ..... St. Paul
Grundset, O. J. ..... Montrose
Guernsey, D. E. ..... Rochester
Guilfoile, P. J. ..... Delano
Gullixson, Andrew ..... Albert Lea
Gully, R. J. ..... Cambridge
Gunderson, N. A. ..... Minneapolis
‡Gunlaugson, F. G. ..... Mankato
Gushurst, E. G. ..... Minneapolis
Gustason, H. T. ..... Minneapolis
Guthrie, R. F. ..... Rochester

Habein, H. C. ..... Rochester
Haberman, Emil ..... Osakis
†Hacking, F. H. ..... Minneapolis
Haes, J. E. ..... Vernon Center
*Haessly, S. B. ..... Faribault
Hagaman, G. K. ..... St. Paul
Hagen, O. E. ..... Butterfield
Hagen, O. J. ..... Moorhead
‡Hagen, W. S. ..... Minneapolis
†Haggard, G. D. ..... Minneapolis
Haight, G. G. ..... Audubon
Haines, J. H. ..... Stillwater
Haines, S. F. ..... Rochester
Haisten, A. S. ..... Rochester
Halenbeck, P. L. ..... St. Cloud

Hall, A. R. ..... St. Paul
Hall, B. E. ..... Rochester
Hall, H. H. ..... St. Paul
Hall, J. M. ..... Minneapolis
Halladay, G. J. ..... Brainerd
Hallberg, C. A. ..... Minneapolis
Hallberg, O. E. ..... Rochester
Hallenbeck, D. F. ..... Rochester
Hallenbeck, G. A. ..... Rochester
Haller, W. M. ..... Bemidji
‡Hallock, Philip ..... Minneapolis
Halloran, W. H. ..... Jackson
Halpern, D. J. ..... Brewster
Halpin, J. E. ..... Rush City
Hamel, A. L. ..... Minneapolis
Hamlin, G. B. ..... Minneapolis
‡Hamlon, J. S. ..... St. Charles
Hammar, L. M. ..... Butterfield
Hammermeister, T. F. ..... New Ulm
‡Hammerstad, L. M. ..... Minneapolis
Hammes, E. M. ..... St. Paul
Hammond, A. J. H. ..... Minneapolis
Hammond, J. F. ..... St. Paul
Haney, C. L. ..... Duluth
Hankerson, R. G. ..... Minnesota Lake
Hannah, H. B. ..... Minneapolis
Hanover, R. D. ..... Littlefork
Hansen, C. O. ..... Minneapolis
Hansen, E. W. ..... Minneapolis
Hansen, Olga S. ..... Minneapolis
Hansen, Rorbye ..... Monticello
Hanson, A. M. ..... Faribault
Hanson, E. O. ..... Cloquet
Hanson, E. C. ..... New York Mills
Hanson, H. B. ..... St. Paul
Hanson, H. J. ..... Minneapolis
Hanson, H. V. ..... Minneapolis
Hanson, M. B. ..... Minneapolis
Hanson, W. A. H. ..... Minneapolis
Happe, L. J. ..... Minneapolis
Hardman, Sue C. ..... Rochester
Hargraves, M. M. ..... Rochester
Harley, R. D. ..... Rochester
Harlow, H. D. ..... Virginia
Harmon, G. E. ..... St. Paul
Harper, S. B. ..... Rochester
Harri, E. J. ..... Carlton
Harris, C. N. ..... Hibbing
Harriman, Leonard. ..... Howard Lake
Harrington, C. D. ..... Wayzata
Harrington, F. E. ..... Minneapolis
Harrington, S. W. ..... Rochester
Harrison, P. W. ..... Worthington
‡Hart, V. L. ..... Minneapolis
Hart, W. E. ..... Monticello
Hartfiel, W. F. ..... St. Paul
Hartley, E. C. ..... St. Paul
Hartman, H. R. ..... Rochester
‡Hartmann, C. M. ..... Fairfax
Hartnagel, G. F. ..... Red Wing
Hartung, E. H. ..... Claremont
†Hartzell, T. B. ..... Minneapolis
‡Harvey, George, Jr. ..... Rochester
Haskell, A. D. ..... Alexandria
Hassett, M. F. ..... St. Paul
Hassett, R. G. ..... Mankato
Hastings, D. R. ..... Minneapolis
Hatch, W. E. ..... Duluth
‡Hathaway, S. J. ..... Proctor
‡Hauge, E. T. ..... Minneapolis
Hauge, M. I. ..... Clarkfield
Haugen, J. A. ..... Minneapolis
Haugseth, Enoch ..... Twin Valley
Hauser, V. P. ..... St. Paul
Hausmann, P. F. ..... Rochester
Havel, H. W. ..... Jordan
Havel, T. E. ..... Blue Earth
Haven, W. K. ..... Minneapolis
Havens, F. Z. ..... Rochester
Havens, J. G. W. ..... Austin
†Haverfield, Addie R. ..... Minneapolis
Hawkinson, J. P. ..... Crosby
‡Hawkinson, R. P. ..... Minneapolis
Hayes, J. M. ..... Minneapolis
Hayes, M. F. ..... Nashwauk
Hays, A. T. ..... Minneapolis
‡Head, D. P. ..... Minneapolis
Head, G. D. ..... Minneapolis
Healy, R. T. ..... Pierz
†Heath, A. C. ..... Stillwater
‡Hebbel, Robert ..... Minneapolis
Hebeisen, M. B. ..... Chaska
Heck, F. J. ..... Rochester
Heck, W. W. ..... St. Paul
Hedback, A. E. ..... Minneapolis
Hedberg, G. A. ..... Nopeming
Hedemark, H. H. ..... Thief River Falls
Hedenstrom, F. G. ..... St. Paul
Hedenstrom, L. H. ..... Cambridge
Hedin, R. F. ..... Red Wing
Heersema, P. H. ..... Rochester
Hegge, O. H. ..... Austin
Hegge, R. S. ..... Austin
Heiam, W. C. ..... Cook
Heiberg, E. A. ..... Fergus Falls
Heiberg, O. M. ..... Worthington
Heilman, Charles ..... Fargo, N. D.
Heilman, Dorothy M. H. ..... Rochester
Heilman, F. R. ..... Rochester
Heim, R. R. ..... Minneapolis
Heimark, J. J. ..... Fairmont
Heinz, Ivy B. ..... Hastings
Heinz, L. H. ..... Hastings
Heise, Herbert ..... Winona
Heise, W. F. C. ..... Winona
Heise, W. V. ..... Winona
‡Helferty, J. K. ..... Tracy
Helland, G. M. ..... Spring Grove
Helland, J. W. ..... Spring Grove
Helmholz, H. F. ..... Rochester
Helseth, H. K. ..... Thief River Falls
Hempstead, B. E. ..... Rochester
†Hemstead, Werner ..... Fergus Falls
Hench, P. S. ..... Rochester
Henderson, A. J. G. ..... Kiester
Henderson, J. W. ..... Rochester
Henderson, M. S. ..... Rochester
Hendrickson, J. F. ..... Minneapolis
Hendrickson, R. R. ..... Lake Park
Hengstler, W. H. ..... St. Paul
Henney, W. H. ..... McIntosh
Henrikson, E. C. ..... Minneapolis
†Henry, C. E. ..... Kirksville, Mo.
Henry, C. J. ..... Milaca
Henry, M. O. ..... Minneapolis
Hensel, C. N. ..... St. Paul
Henslin, A. E. ..... Le Roy
Herbert, W. L. ..... Minneapolis
‡Herbolsheimer, A. J. ..... Minneapolis
Herbst, R. F. ..... Wykoff
*Herman, A. L. ..... Minneapolis
Herman, Samuel ..... St. Paul
Hermanson, P. E. ..... Hendricks
Heron, R. C. ..... St. Paul
Herrell, W. E. ..... Rochester
Herrmann, E. T. ..... St. Paul
Hertel, G. E. ..... Austin
Hertz, M. J. ..... St. Paul
Hewitt, Edith S. ..... Rochester
†Hewitt, R. M. ..... Rochester
†Heyerdale, O. C. ..... Rochester
Heyerdale, W. W. ..... Rochester
Hiebert, H. L. ..... Topeka, Kans.
Higgins, G. K. ..... Oak Terrace
Higgins, J. H. ..... Minneapolis
Higginson, J. F. ..... Rochester
Higgs, W. W. ..... Park Rapids
Hildebrand, Alice G. ..... Rochester
Hilding, A. C. ..... Duluth
Hilger, A. W. ..... St. Paul
Hilger, D. D. ..... St. Paul
‡Hilger, J. A. ..... St. Paul
Hilger, L. A. ..... St. Paul
‡Hilger, L. D. ..... St. Paul
Hill, Eleanor J. ..... Minneapolis
Hill, F. E. ..... Duluth
Hill, J. R. ..... Rochester
Hillis, S. I. ..... Minneapolis
Hinckley, R. G. ..... Minneapolis
Hines, E. A., Jr. ..... Rochester
Hiniker, L. P. ..... St. Paul
Hiniker, P. J. ..... Le Sueur
Hinshaw, H. C. ..... Rochester
Hirschboeck, F. J. ..... Duluth
†Hirschfelder, A. D. ..... Minneapolis
†Hirschfield, M. S. ..... Duluth
Hirshfield, F. R. ..... Minneapolis
Hitchings, W. S. ..... Lakefield
Hoaglund, A. W. ..... Minneapolis
Hoagland, P. I., Jr. ..... Rochester
†Hobbs, C. A. ..... Minneapolis
Hochfilzer, J. J. ..... St. Paul
Hodapp, R. J. ..... Willmar
Hodge, S. V. ..... Minneapolis
Hodgson, Jane E. ..... Rochester
Hoff, Alfred ..... St. Paul
Hoff, H. O. ..... Duluth
Hoffbauer, F. W. ..... Minneapolis
Hoffert, H. E. ..... Minneapolis
Hoffman, M. H. ..... St. Paul
Hoffman, R. A. ..... Minneapolis
Hoffman, W. L. ..... Minneapolis
Hoidale, A. D. ..... Tracy
†Holcomb, J. T. .. Marine-on-St. Croix
Holcomb, O. W. ..... St. Paul
†Holl, P. M. ..... Minneapolis
Hollands, W. H. ..... Fisher
Holm, H. H. ..... Glencoe
†Holm, P. F. ..... Wells
‡Holmberg, C. J. ..... Minneapolis
Holmberg, L. J. ..... Canby
Holmen, R. W. ..... St. Paul
Holmes, A. E. ..... Rush City
Holmstrom, C. H. ..... Warren
‡Holt, G. W. ..... Wabasha
Holt, J. E. ..... St. Paul
Holt, W. B. ..... Minneapolis
Holtan, Theodore ..... Waterville
Holzapfel, F. C. ..... Minneapolis
Honke, R. W. ..... Proctor
Hopkins, E. O. ..... Rochester
Hopkins, G. W. ..... St. Paul
Hopping, R. A. ..... Rochester
Horton, B. T. ..... Rochester
‡Hottinger, R. C. ..... Janesville
Houkom, Bjarne ..... Minneapolis
Houkom, S. S. ..... Duluth
House, Z. E. ..... Cass Lake
Houston, D. M. ..... Park Rapids
Hovde, Rolf ..... Winthrop
Hovland, M. L. ..... Minneapolis
Howard, M. A. ..... St. Paul
Howard, M. I. ..... Mankato
Howard, W. S. ..... St. Paul
Howell, L. P. ..... Rochester
Hoyer, L. J. ..... Windom
Hoyne, R. M. ..... Rochester
Hubbard, O. E. ..... Brainerd
Hubin, E. G. ..... Deerwood
Hudec, E. R. ..... Echo
Hudson, G. E. ..... Minneapolis
Huenekens, E. J. ..... Minneapolis
Huffington, H. L. ..... Mankato
Hughes, T. J. ..... Rochester
Hullsiek, H. E. ..... St. Paul
‡Hullsiek, R. B. ..... St. Paul
Hultkrans, J. C. ..... Minneapolis
Hultkrans, R. E. ..... Minneapolis
Hummer, G. J. ..... Rochester
Humphrey, E. W. ..... Moorhead
Humphrey, W. R. ..... Stillwater
Hunt, A. B. ..... Rochester
Hunt, R. C. ..... Fairmont
Hunt, R. S. ..... Fairmont
Hunte, A. F. ..... Globe, Ariz.
Hurd, Annah ..... Minneapolis
Hursh, M. M. ..... Hibbing
‡Hutchinson, C. J. ..... Minneapolis
Hutchinson, Henry ..... Moose Lake
Huxley, F. R. ..... Faribault
Hymes, Charles ..... Minneapolis
Hynes, J. E. ..... Minneapolis

Ide, A. W. ..... St. Paul
‡Idstrom, L. G. ..... Minneapolis
Ikeda, Kano ..... St. Paul
Ingebrigtson, E. K. G. ..... Moorhead
Ingerson, C. A. ..... St. Paul
Irvine, H. G. ..... Minneapolis
Ittner, G. W., Jr. ..... St. Paul
Iverson, R. M. ..... Rochester
Ivie, J. McK. ..... Rochester

Jackman, R. J. ..... Rochester
†Jackson, C. M. ..... Minneapolis
Jacobs, D. L. ..... Willmar
Jacobs, G. C. ..... Fergus Falls
Jacobs, J. C. ..... Willmar
Jacobson, C. E., Jr. ..... Rochester
Jacobson, Clarence ..... Chisholm
Jacobson, C. W. .. Thief River Falls
*Jacobson, D. J. ..... Bemidji
‡Jaeck, J. L. ..... Minneapolis
Jamieson, E. F. ..... Brainerd
Jarvis, B. W. ..... Lowry
Jennings, Mary H. ..... Minneapolis
Jensen, A. M. ..... Brownton
Jensen, H. C. ..... Minneapolis
Jensen, M. J. ..... Minneapolis
Jensen, R. A. ..... Minneapolis
Jensen, T. J. ..... Duluth
Jesion, J. W. ..... St. Paul
Jessico, C. M. ..... Duluth
Johanson, W. G. ..... St. Paul
Johnson, A. B. ..... Minneapolis
Johnson, A. E. ..... Red Wing
Johnson, A. E. ..... Minneapolis
Johnson, A. M. ..... St. Paul
Johnson, A. R. ..... Isanti
Johnson, C. E. ..... St. Paul
Johnson, C. R. ..... Rochester
Johnson, C. M. ..... Dawson
Johnson, D. L. ..... Little Falls
Johnson, D. W. ..... Fairmont
Johnson, E. W. ..... Bemidji
Johnson, E. W. ..... Minneapolis
Johnson, Evelyn V. ..... St. Louis Park
Johnson, H. A. ..... Minneapolis
Johnson, H. C. ..... North Mankato
†Johnson, H. P. ..... Fairmont
Johnson, H. P. ..... Harmony
Johnson, Hans ..... Kerkhoven
Johnson, J. A. ..... St. Paul
Johnson, J. A. ..... Minneapolis
Johnson, Julius ..... Minneapolis
‡Johnson, J. W. ..... Kerkhoven

‡Johnson, K. E. ..... Duluth
‡Johnson, M. R. ..... Red Wing
†Johnson, N. A. ..... Santa Monica, Calif.
Johnson, N. P. ..... Minneapolis
Johnson, N. T. ..... Minneapolis
Johnson, O. H. ..... Redwood Falls
Johnson, O. V. ..... Fergus Falls
Johnson, Olga H. ..... Moorhead
Johnson, P. C. ..... Tyler
Johnson, R. A. ..... Minneapolis
Johnson, R. B. ..... Lanesboro
‡Johnson, R. E. ..... Minneapolis
Johnson, R. E. ..... Worthington
Johnson, R. G. ..... Stillwater
†Johnson, T. H. ..... San Francisco, Calif.
‡Johnson, V. M. ..... Dawson
Johnson, Walfred ..... Sauk Centre
Johnson, W. E. ..... Morgan
‡Johnson, Y. T. ..... Minneapolis
Johnston, L. F. ..... Slayton
Jolin, F. M. ..... Bovey
Jolin, R. V. ..... Grand Rapids
Jones, A. W. ..... Red Wing
Jones, E. M. ..... St. Paul
‡Jones, H. W., Jr. ..... Minneapolis
Jones, O. H. ..... Madison Lake
Jones, R. N. ..... St. Cloud
Jones, W. R. ..... Minneapolis
Jordan, L. S. ..... Granite Falls
Josewich, Alexander ..... Minneapolis
Josewski, R. J. ..... Stillwater
Joss, C. S. ..... Rochester
Joyce, G. L. ..... Rochester
Judd, D. B. ..... Rochester
Judd, E. S., Jr. ..... Rochester
Judd, W. H. ..... Minneapolis
Juergens, H. M. ..... Belle Plaine
Juers, E. H. ..... Red Wing
Juliar, R. O. ..... St. Clair
‡Jump, W. C. ..... Kasson
Jurdy, M. J. ..... Minneapolis
Just, H. J. ..... Lafayette

Kaasa, L. J. ..... Albert Lea
Kalin, O. T. ..... Minneapolis
Kalinoff, Demeter ..... Stillwater
Kallestad, L. L. ..... Hutchinson
Kamman, G. R. ..... St. Paul
Kamp, B. A. ..... Albert Lea
Kannary, E. L. ..... St. Paul
Kanne, C. W. ..... Faribault
Kapernick, J. S. ..... Rochester
Kaplan, D. H. ..... St. Paul
Karleen, C. I. ..... Tracy
Karlstrom, A. E. ..... Minneapolis
Karn, B. R. ..... Ortonville
‡Karn, J. F. ..... St. Paul
Karon, I. M. ..... St. Paul
Kasper, E. M. ..... St. Paul
Kath, R. H. ..... Woodlake
Kaufman, E. J. ..... Appleton
Kaufman, W. B. ..... Mankato
Kaufman, W. C. ..... Appleton
Kauvar, A. J. ..... Rochester
Kearney, R. W. ..... Mankato
Keating, F. R., Jr. ..... Rochester
Keefe, R. E. ..... St. Paul
Keith, H. M. ..... Rochester
Keith, N. M. ..... Rochester
Keithahn, E. E. ..... Kimball
Kelby, G. M. ..... Minneapolis
Kelly, A. C. ..... Duluth
Kelly, J. V. ..... St. Paul
Kelly, P. H. ..... St. Paul
Kelsey, C. G. ..... Hinckley
Kemp, A. F. ..... Mankato
Kemp, M. W. ..... Moose Lake
Kenefick, E. V. ..... St. Paul
Kennedy, C. C. ..... Minneapolis
Kennedy, Jane F. ..... Minneapolis
Kennedy, R. L. J. ..... Rochester
Kennedy, W. A. ..... St. Paul
Kenyon, T. J. ..... St. Paul
Kepler, E. J. ..... Rochester
Kerkhof, A. C. ..... Minneapolis
Kerlan, Irvin ..... Washington, D. C.
‡Kern, M. C. ..... Freeport
Kernohan, J. W. ..... Rochester
Kertesz, Geza ..... Minneapolis
Kesting, Herman ..... St. Paul
‡Kettlewell, R. B. ..... Sauk Center
Keyes, J. D. ..... Winona
Kibbe, O. A. ..... Minneapolis
Kierland, P. E. ..... Alexandria
Kierland, R. R. ..... Rochester
Kiernan, P. C. ..... Rochester
Kiesling, I. H. ..... Coleraine
Kilbride, E. A. ..... Worthington
Kilbride, J. S. ..... Worthington
Kimmel, G. C., Jr. ..... Red Wing
†King, E. A. ..... Minneapolis
King, Frances W. ..... Oak Terrace

King, G. L. ..... St. Paul
King, H. T. ..... Minneapolis
Kingsbury, E. M. ..... Moose Lake
Kinsella, T. J. ..... Minneapolis
Kirk, G. P. ..... East Grand Forks
Kirklin, B. R. ..... Rochester
Kirklin, O. L. ..... Rochester
Kistler, A. J. ..... Minneapolis
Kistler, C. M. ..... Minneapolis
Klein, Harry ..... Duluth
Klein, H. N. ..... St. Paul
Klein, J. C. ..... Shakopee
Klima, W. W. ..... Stewart
Klinkenberg, R. B. ..... Rochester
Kloos, E. K. ..... Rochester
Knapp, F. N. ..... Duluth
Knapp, M. E. ..... Minneapolis
Knauff, M. K. ..... St. Paul
Knight, R. R. ..... Minneapolis
Knight, R. T. ..... Minneapolis
Knights, J. A. ..... Bemidji
Knutson, G. A. ..... Greenbush
Koelsche, G. A. ..... Rochester
Koenigsberger, Charles ..... Mankato
Koepcke, G. M. ..... Minneapolis
Koepsell, A. A. H. ..... St. Paul
Kohlbry, C. O. ..... Duluth
Kohler, D. W. ..... St. Joseph
Kolars, J. J. ..... Le Center
Koller, H. M. ..... Minneapolis
Koller, L. R. ..... Minneapolis
Koop, S. H. ..... Richmond
Korchik, J. P. ..... Minneapolis
Kortsch, F. P. ..... Prior Lake
Kostick, W. R. ..... Fertile
Kotchevar, F. R. ..... Eveleth
Koucky, R. W. ..... Minneapolis
‡Kozberg, Oscar ..... Moose Lake
Kraft, Peter ..... Duluth
Krause, C. W. ..... Fairmont
Kreilkamp, B. L. ..... Rochester
Kreuzer, T. C. ..... Marshall
Krusen, F. H. ..... Rochester
Kucera, F. J. ..... Hopkins
Kucera, L. J. ..... Lonsdale
Kucera, S. T. ..... Lonsdale
Kucera, W. J. ..... Minneapolis
Kugler, A. A. ..... St. Paul
Kuhlmann, August ..... Melrose
Kusske, A. L. ..... New Ulm
*Kuth, J. R. ..... Duluth
Kvale, W. F. ..... Rochester
Kvitrud, Gilbert ..... St. Paul

La Bree, R. H. ..... Duluth
Laird, A. T. ..... Nopeming
Lajoie, J. M. ..... Minneapolis
Lamb, H. L. ..... Little Falls
Lander, H. H. ..... Rochester
Lang, L. A. ..... Minneapolis
Langenderfer, F. V. ..... St. Paul
Lannin, J. C. ..... Mabel
Lapierre, A. P. ..... Minneapolis
Lapierre, J. T. ..... Minneapolis
Large, H. R. ..... Rochester
Larrabee, W. F., Jr. ..... Rochester
Larsen, C. L. ..... St. Paul
Larsen, F. W. ..... Minneapolis
Larsen, O. O. ..... Detroit Lakes
Larson, Arnold ..... Detroit Lakes
Larson, C. M. ..... Minneapolis
Larson, J. T. ..... Lake Wilson
Larson, L. J. ..... Bagley
‡Larson, L. M. ..... Minneapolis
Larson, L. M. ..... Oak Terrace
Larson, M. H. ..... Nicollet
Larson, P. N. ..... Minneapolis
Latchem, C. W. ..... Rochester
‡Lauer, D. J. ..... St. Paul
La Vake, R. T. ..... Minneapolis
Lax, M. H. ..... St. Paul
Laymon, C. W. ..... Minneapolis
Lazar, H. L. ..... Minneapolis
Leahy, Bartholomew ..... St. Paul
Leavenworth, R. O. ..... St. Paul
†Leavitt, H. H. ..... Minneapolis
Lebowske, J. A. ..... Minneapolis
Leck, P. C. ..... Austin
Leddy, E. T. ..... Rochester
Lee, H. M. ..... Minneapolis
Lee, H. W. ..... Brainerd
Lee, J. L. ..... Watertown
Lee, W. A. ..... Fergus Falls
Lee, W. N. ..... Madison
Leemhuis, G. H. ..... Aitkin
Lehnhoff, H. J., Jr. ..... Rochester
Leibold, H. H. ..... Parkers Prairie
Leick, R. M. ..... St. Paul
‡Leighton, Robert ..... Evansville
Leitch, Archibald ..... St. Paul
Leitch, N. M. ..... Warroad
Leland, H. R. ..... Minneapolis

‡Leland, J. A. C., Jr. ..... Minneapolis
Leland, J. T. ..... Herman
Lemon, W. S. ..... Rochester
Lenander, M. E. ..... St. Peter
Lenarz, A. J. ..... Browerville
Lenont, C. B. ..... Virginia
Lenz, J. R. ..... Morton
Lenz, O. A. ..... Minneapolis
Leonard, L. J. ..... Minneapolis
Leonard, Samuel ..... Minneapolis
Leopard, B. A. ..... Albert Lea
Lepak, F. J. ..... Duluth
Lepak, J. A. ..... St. Paul
†Lerche, William ..... Cable, Wis.
Leven, N. L. ..... St. Paul
Levin, B. G. ..... St. Paul
Levinson, J. P. ..... Rochester
Levitt, G. X. ..... St. Paul
Lewis, A. J. ..... Henning
Lewis, C. B. ..... St. Cloud
Lexa, F. J. ..... Lonsdale
Libert, J. N. ..... St. Cloud
Lick, C. L. ..... St. Paul
Liedloff, A. G. ..... Mankato
‡Lien, R. J. ..... Rochester
Liffrig, W. W. ..... Goodhue
Lightbourn, E. L. ..... St. Paul
Lillehei, E. J. ..... Robbinsdale
Lillie, H. I. ..... Rochester
Lillie, J. C. ..... Rochester
Lima, L. R. ..... Montevideo
Lind, C. J. ..... Minneapolis
Lindahl, W. W. ..... Rochester
Lindberg, A. C. ..... Minneapolis
Lindberg, A. L. ..... Wheaton
Lindberg, V. L. ..... Minneapolis
Linde, Herman ..... Cyrus
‡Lindgren, R. C. ..... Minneapolis
Lindquist, R. H. ..... Minneapolis
Lindsay, W. V. ..... Winona
Linner, H. P. ..... Minneapolis
†Linton, W. B. ..... Minneapolis
Lippman, E. S. ..... Minneapolis
Lippman, H. S. ..... St. Paul
Lippmann, E. W. ..... Hutchinson
‡Lipschultz, Oscar ..... Minneapolis
Lipscomb, P. R. ..... Rochester
Litchfield, J. T. ..... Minneapolis
Litman, A. B. ..... Minneapolis
Litman, S. N. ..... Duluth
Little, A. G., Jr. ..... Rochester
†Little, W. J. ..... St. Paul
Litzenberg, J. C. ..... Minneapolis
Lloyd, H. J. ..... Mankato
†Lochead, D. C. ..... Rochester
Logan, A. H. ..... Rochester
Logan, G. B. ..... Rochester
Logefeil, R. C. ..... Minneapolis
Lohmann, J. G. ..... Jasper
‡Loken, S. M. ..... St. Paul
Loken, Theodore ..... Ada
Lommen, P. A. ..... Austin
†Long, Jesse ..... Minneapolis
Loofbourrow, E. H. ..... Keewatin
Loomis, E. A. ..... Minneapolis
Loomis, G. L. ..... Winona
Love, F. A. ..... Carlos
Love, J. G. ..... Rochester
‡Love, W. R. ..... Rochester
Lovelace, W. R. ..... Rochester
Lovelady, S. B. ..... Rochester
Lovering, Joseph ..... Rochester
Lovett, Beatrice R. ..... Oak Terrace
Lovshin, L. L. ..... Rochester
Low, J. E. ..... Ronan, Mont.
Lowe, E. R. ..... So. St. Paul
Lowe, T. A. ..... So. St. Paul
Lowry, Elizabeth C. ..... Minneapolis
Lowry, Thomas ..... Minneapolis
Luck, Hilda ..... Mankato
Luckey, C. A. ..... Rochester
Luden, Georgine
Victoria, B. C., Canada
Lueck, A. G. ..... Rochester
Luedtke, G. H. ..... Fairmont
Lufkin, C. D. ..... Northfield
‡Lufkin, N. H. ..... Minneapolis
Lund, C. J. T. ..... Fergus Falls
Lund, W. J. ..... Staples
Lundberg, Ruth I. ..... Faribault
Lundblad, R. A. ..... Minneapolis
‡Lundblad, S. W. ..... Minneapolis
Lundgren, A. C. ..... Minneapolis
Lundholm, A. M. ..... St. Paul
Lundquist, C. W. ..... Winona
Lundquist, E. F. ..... Minneapolis
Lundy, J. S. ..... Rochester
Lyght, C. E. ..... Northfield
Lynam, Frank ..... Duluth
Lynch, F. W. ..... St. Paul
Lynch, M. J. ..... Minneapolis
Lynch, R. C. ..... Rochester

Lynde, O. G.....Thief River Falls
Lysne, Henry.....Minneapolis
Lysne, Myron.....Minneapolis

Macbeth, J. L.....St. Clair
†MacCarty, W. C.....Rochester
MacCarty, W. C., Jr.....Rochester
MacDonald, A. E.....Minneapolis
MacDonald, D. A.....Minneapolis
Macey, H. B.....Rochester
Macfarlane, P. H.....Chisholm
Mach, F. B.....Minneapolis
‡Mack, J. J.....St. Louis, Mo.
MacKay, H. J.....Seattle, Wash.
MacKinnon, D. C.....Minneapolis
Macklin, W. E., Jr.....Litchfield
MacLean, A. R.....Rochester
MacMillan, D. G.....Triumph
Macnie, J. S.....Minneapolis
‡MacRae, G. C.....Duluth
Madden, J. F.....St. Paul
Maeder, E. C.....Minneapolis
Maertz, W. F.....New Prague
‡Magath, T. B.....Rochester
Magney, F. H.....Duluth
Magnusen, A. E.....Graceville
Mahle, D. G.....Plainview
Mahowald, Aloys.....Albany
Maino, C. R.....Rochester
Maitland, D. P.....Jackson
Maitland, E. T.....Jackson
Maland, C. O.....Minneapolis
Malerich, J. A.....Shakopee
Malmstrom, J. A.....Virginia
Manley, J. R.....Duluth
Manlove, F. R.....Rochester
†Mann, F. C.....Rochester
†Manson, F. M.....Worthington
†Marcley, W. J.....Minneapolis
Mariette, E. S.....Oak Terrace
Mark, D. B.....Minneapolis
‡Mark, Hilbert.....Minneapolis
Marking, G. H.....Osseo
*Markoe, J. C.....St. Paul
‡Marks, R. W.....St. Paul
Martin, D. L.....So. St. Paul
Martin, G. M.....Rochester
Martin, T. P.....Arlington
Martin, W. C.....Duluth
Martineau, J. L.....St. Paul
Martinson, C. J.....Wayzata
Mason, B. A.....Rochester
‡Mason, J. A.....International Falls
Masson, D. M.....Rochester
Masson, J. C.....Rochester
†Matchan, G. R.....Minneapolis
Matthews, Justus.....Minneapolis
Mattill, P. M.....Oak Terrace
Mattison, P. A.....Winona
Mattison, R. E.....Minot, N. D.
‡Mattson, A. D.....Atwater
Mattson, C. H.....St. Paul
Mattson, H. A. N.....Minneapolis
Maxeiner, S. R.....Minneapolis
May, W. H.....Minneapolis
‡Mayne, R. M.....Duluth
Mayo, C. W.....Rochester
Maytum, C. K.....Rochester
McBroom, D. E.....St. Paul
McCall, C. H.....Rochester
McCallig, J. J.....Rochester
McCann, D. F.....Bemidji
McCarten, F. M.....Stillwater
‡McCarthy, Donald.....Minneapolis
McCarthy, J. J.....St. Paul
McCarthy, W. J.....Madelia
McCarthy, W. R.....St. Paul
McCartney, J. S.....Minneapolis
McCarty, P. D.....Ely
McClanahan, J. H..White Bear Lake
McClanahan, T. S..White Bear Lake
McCloud, C. N., Jr.....Rochester
†McComb, C. F.....Duluth
†McCoy, Mary K.....Duluth
‡McCrimmon, H. P.....Minneapolis
McDaniel, Orianna.....Minneapolis
McDonald, A. L.....Duluth
McDonald, J. R.....Rochester
McDowell, J. P.....St. Cloud
McEachern, C. G.....Rochester
McElmeel, E. F.....Pipestone
McEnaney, C. T.....Owatonna
McEwan, Alexander.....St. Paul
McFarland, A. H.....Minneapolis
McGandy, R. F.....Minneapolis
McGeary, G. E.....Minneapolis
McGroarty, J. J.....Easton
McGuigan, H. T.....Red Wing
McHaffie, O. L.....Duluth
McInerny, M. W.....Minneapolis
McIntire, H. M.....Waseca
*McIntyre, George...San Marino, Calif.
McIntyre, J. A.....Owatonna
McIver, B. A.....Lowry
McKaig, C. B.....Pine Island
McKelvey, J. L.....Minneapolis
McKenna, J. K.....Austin
McKenna, M. J.....Grand Rapids
McKenzie, C. H.....Minneapolis
McKeon, J. O.....Montgomery
McKinlay, C. A.....Minneapolis
McKinley, J. C.....Minneapolis
McKinney, F. S.....Minneapolis
McLane, Evelyn G.....Jackson
McLane, W. O.....Perham
†McLaren, Jennette M.....Minneapolis
McLaughlin, E. M.....Winona
McLennan, C. E.....Minneapolis
McLeod, J. L.....Grand Rapids
McMahon, L. H.....Breckenridge
McMahon, M. J.....Green Isle
McNeary, D. J.....Rochester
*McNevin, C. F.....St. Paul
McNutt, J. R.....Duluth
McPheeters, H. O.....Minneapolis
†McQuarrie, Irvine.....Minneapolis
Mead, C. H.....Duluth
Mead, F. B.....Rochester
Meade, J. R.....St. Paul
Mears, B. J.....St. Paul
Mears, R. F.....Northfield
Medelman, J. P.....St. Paul
Meinert, A. E.....Winona
Meland, E. L.....Minneapolis
Melby, Benedik.....Blooming Prairie
Mellby, O. F.....Thief River Falls
Melzer, G. R.....Lyle
Mercil, W. F.....Crookston
Merkert, C. E.....Minneapolis
Merkert, G. L.....Minneapolis
†Merrill, Elisabeth.....Minneapolis
Merrill, Robert.....Morris
Merriman, L. L.....Duluth
Merritt, W. A.....Rochester
Mesker, G. H.....Olivia
Messler, J. D.....Rochester
Meyer, A. A.....Melrose
Meyer, E. L.....Minneapolis
†Meyer, J. O.....Grand Rapids
Meyer, P. F.....Faribault
‡Meyer, W. M.....Winona
Meyerding, E. A.....St. Paul
Meyerding, H. W.....Rochester
Michael, J. C.....Minneapolis
Michel, H. H.....Minneapolis
Michelson, H. E.....Minneapolis
Mickelson, J. C.....Mankato
Miller, E. W.....St. Peter
Miller, H. E.....Minneapolis
‡Miller, Hugo E.....Minneapolis
Miller, J. C.....Minneapolis
Miller, J. R., Jr.....Rochester
Miller, V. I.....Mankato
Miller, W. A.....New York Mills
Mills, J. L.....Winnebago
Milton, J. S.....Minneapolis
Minge, R. K.....Clarkfield
Mingo, F. E.....Hugo
Minsky, A. A.....Minneapolis
Minty, Earl W.....Duluth
Mitby, I. L.....Aitkin
Mitchell, E. C.....Minneapolis
Mitchell, R. S.....Grand Meadow
Moberg, C. W.....Detroit Lakes
Moe, J. H.....Minneapolis
Moe, R. J.....Duluth
Moe, Thomas.....Moose Lake
Moen, J. K., Jr.....Minneapolis
Moersch, F. P.....Rochester
Moersch, H. J.....Rochester
Moga, J. A.....St. Paul
*Moir, W. W.....Minneapolis
Molander, H. A.....St. Paul
‡Mollers, T. P.....Mountain Iron
Monahan, R. H.....International Falls
Monroe, P. B.....Two Harbors
Monserud, N. O.....Cloquet
Monson, E. M.....Minneapolis
Monson, L. J.....Canby
Montgomery, Hamilton.....Rochester
Mooney, L. P.....Graceville
Moquin, Marie A.....St. Paul
More, C. W.....Eveleth
Morehead, D. E.....Owatonna
Moren, Edward.....Minneapolis
‡Moren, L. A.....St. Paul
Moreton, R. D.....Rochester
Morgan, H. O.....Amboy
Moriarty, Berenice.....St. Paul
Moriarty, Cecile R.....St. Paul
Morissette, Leopold.....Rochester
Mork, A. H.....Anoka
Mork, B. O., Jr.....Worthington
Mork, B. O., Sr.....Worthington
Mork, F. E.....Anoka
Morley, G. A.....Crookston
Morlock, C. G.....Rochester
Morrison, A. W.....Minneapolis
Morrison, Charlotte J.....Minneapolis
†Morrissey, F. B.....St. Paul
Morrow, J. J.....Austin
Morse, M. P.....Le Roy
Morse, R. W.....Minneapolis
Morsman, L. W.....Hibbing
Mosby, M. E.....Long Prairie
Moses, Joseph, Jr.....Northfield
Moss, M. N.....St. Paul
Mouritsen, G. J.....Fergus Falls
Mousel, L. H.....Rochester
Mueller, R. F.....Two Harbors
Mueller, Selma C.....Duluth
Muir, W. F.....Graceville
Muller, R. T.....St. Paul
‡Mulligan, A. M.....Brainerd
Murphy, E. P.....Minneapolis
Murphy, I. J.....Minneapolis
Murray, R. A.....Rochester
‡Murray, R. A.....Aitkin
Musachio, N. F.....Foley
Musgrove, J. E.....Rochester
Mussey, R. D.....Rochester
Myers, J. A.....Minneapolis
Myre, C. R.....Paynesville

Naegeli, A. E.....St. Paul
Naegeli, Frank.....Fergus Falls
Nagel, H. D.....Waconia
‡Naslund, A. W.....Minneapolis
Nass, H. A.....Mabel
Nay, R. M.....Rochester
Neal, J. M.....Rochester
Neale, R. M.....Rochester
Nealy, D. E.....Adrian
Neary, R. P.....Minneapolis
Neel, H. B.....Albert Lea
Neff, W. S.....Virginia
Nehring, J. P.....Preston
Nelson, E. H.....Chisholm
Nelson, E. J.....Owatonna
Nelson, E. N.....Minneapolis
Nelson, H. E.....Crookston
†Nelson, H. S.....Excelsior
Nelson, K. L.....Montgomery
Nelson, L. A.....St. Paul
Nelson, L. S.....Hibbing
Nelson, M. C.....Minneapolis
Nelson, M. S.....Granite Falls
Nelson, N. H.....Minneapolis
Nelson, N. P.....Brainerd
Nelson, O. L. N.....Minneapolis
Nelson, R. A.....Fergus Falls
Nelson, R. L.....Duluth
Nelson, W. I.....Minneapolis
Nelson, W. O. B.....Fergus Falls
Nesheim, M. O.....Emmons
Nessa, C. B.....St. Cloud
Neumaier, Arthur.....Glencoe
Neumann, C. A.....Winona
New, G. B.....Rochester
Newhart, Horace.....Minneapolis
Nichols, A. E.....St. Paul
Nichols, D. R.....Rochester
Nicholson, M. A.....Duluth
Nielsen, A. M.....Northfield
Nilson, H. J.....North Mankato
Ninneman, N. N.....Silver Lake
Nissen, A. S.....Duluth
Noble, J. F.....St. Paul
Noble, J. L.....St. Paul
†Noonan, W. J.....Minneapolis
Norberg, C. E.....Cloquet
Nordin, G. T.....Minneapolis
Nordland, Martin.....Minneapolis
Nordman, W. F.....Mora
Norman, J. F.....Crookston
Norris, N. T.....Caledonia
Noth, H. W.....Minneapolis
Novak, E. E.....New Prague
Nuebel, C. J.....St. Paul
Nuessle, W. G.....Springfield
Nuetzman, A. W.....Faribault
Nutting, R. E.....Duluth
Nydahl, M. J.....St. Paul
Nye, Katherine A.....St. Paul
Nye, Lillian L.....St. Paul
Nygren, W. T.....Braham
Nylander, E. G.....Minneapolis

Oberg, C. M.....Minneapolis
†O'Brien, W. A.....Minneapolis
†O'Brien, W. M.....St. Paul
Ochsner, C. G.....Wabasha
O'Connor, L. J.....St. Paul
Odel, H. M.....Rochester
O'Donnell, D. M.....Ortonville

O'Donnell, J. E.....Minneapolis
Oeljen, S. C. G.....Waseca
Oerting, Harry.....St. Paul
Ogden, Warner.....St. Paul
Ohage, Justus, Jr.....St. Paul
Ohnstad, J. L.....McIntosh
Olds, G. H.....Waseca
O'Leary, P. A.....Rochester
Oliver, C. I.....Graceville
Oliver, I. L.....Graceville
Olmanson, E. G.....St. Peter
Olsen, A. M.....Rochester
Olsen, E. G.....Minneapolis
Olson, A. C.....Minneapolis
Olson, A. E.....Duluth
Olson, A. O.....Duluth
Olson, C. A.....St. Paul
Olson, C. J.....Belle Plaine
Olson, D. C.....Gaylord
Olson, E. A.....Pine Island
Olson, F. A.....Minneapolis
Olson, G. E.....West Concord
Olson, J. D.....Rochester
Olson, K. L.....Minneapolis
Olson, L. M.....Chisago City
Olson, O. A.....Minneapolis
Olson, R. G.....Minneapolis
Olson, S. W.....Rochester
Onsgard, L. K.....Houston
Oppegaard, C. L.....Crookston
Oppegaard, M. O.....Crookston
Oppen, E. G.....Minneapolis
O'Reilley, B. E.....St. Paul
Ormond, D. T.....Waconia
Ostergren, E. W.....St. Paul
Ostergren, Eva-Jane.....St. Paul
Otto, H. C.....Frazee
Ouellette, A. J.....St. Paul
Ould, C. L.....Minneapolis
Owens, W. A.....Montevideo
Owre, Oscar.....Minneapolis

Page, R. L.....St. Charles
‡Paine, J. R.....Minneapolis
Palen, B. J.....Minneapolis
Palmer, C. F.....Albert Lea
Palmer, Frances.....Moose Lake
Palmer, H. A.....Blackduck
Palmer, W. L.....Albert Lea
Palmerton, E. S.....Albert Lea
Pankratz, P. J.....Mountain Lake
Paradis, W. G.....Crookston
†Parker, O. W.....Ely
Parker, R. L.....Rochester
Parker, W. H.....Chisholm
Parkhill, Edith M.....Rochester
Parson, E. I.....Duluth
Parson, L. R.....Elbow Lake
Parson, Lillian B.....Elbow Lake
Parsons, J. G.....Crookston
Parsons, R. L.....Monterey
Pasek, A. W.....Cloquet
Passer, A. A.....Olivia
Patch, O. B.....Duluth
Patterson, H. D.....Anoka
Patterson, S. A.....Duluth
Patterson, W. E.....Minneapolis
Patterson, W. L.....Fergus Falls
Pattison, D. H.....Rochester
Paulson, E. C.....Elbow Lake
Paulson, D. L.....Rochester
Paulson, J. A.....Rochester
Paulson, T. S.....Fergus Falls
Pearsall, R. P.....Virginia
Pearson, B. F.....Shakopee
Pearson, D. J.....Rochester
Pearson, F. R.....St. Paul
Pearson, M. M.....St. Paul
Pedersen, R. C.....Duluth
Pedersen, A. H.....St. Paul
†Pederson, R. M.....Minneapolis
Pemberton, J. deJ.....Rochester
Pender, J. W.....Rochester
Penhall, F. W.....Morton
Penk, E. L.....Springfield
Penn, G. E.....Mankato
Pennie, D. F.....Duluth
Pennington, R. F.....Rochester
°Pennington, Reuben.....Minneapolis
Peppard, T. A.....Minneapolis
‡Perlman, E. C.....Minneapolis
Perry, C. G.....St. Paul
Perry, T. T.....Rochester
Person, J. P.....Alden
Pertl, A. L.....Canby
Peters, G. A.....Rochester
Petersen, J. R.....Minneapolis
Petersen, M. C.....Willmar
Petersen, P. C.....Braham
Petersen, Thorvald.....Minneapolis
Peterson, A. A.....Mora
Peterson, D. B.....St. Paul
Peterson, E. N.....Virginia
Peterson, H. O.....St. Paul
Peterson, H. W.....Minneapolis
‡Peterson, J. H.....Duluth
Peterson, J. L. E.....St. Paul
Peterson, N. P.....Minneapolis
Peterson, O. H.....Minneapolis
Peterson, O. L.....Cokato
Peterson, P. E.....Minneapolis
Peterson, R. A.....Vesta
Peterson, V. N.....St. Paul
Peterson, W. C.....Minneapolis
Peterson, W. G.....Rochester
Peterson, W. H.....Minneapolis
Petit, L. J.....Minneapolis
Petkevich, F. M.....Red Lake Falls
Petraborg, H. T.....Aitkin
Pewters, J. T.....Minneapolis
Peyton, W. T.....Minneapolis
Pfuetze, K. H.....Cannon Falls
Pfunder, M. C.....Minneapolis
‡Phalen, G. S.....Rochester
Phelps, K. A.....Minneapolis
Phillips, A. E.....Delano
Phillips, W. H.....Jordan
Pierce, C. H.....Wadena
Pierson, R. F.....Slayton
Piper, M. C.....Rochester
Piper, W. A.....Mountain Lake
Platou, E. S.....Minneapolis
Platou, R. V.....Minneapolis
Plimpton, N. C., Jr.....Rochester
Plondke, F. J.....St. Paul
Plowman, E. T.....Marble
Plummer, W. A.....Rochester
Pogue, R. E.....Watertown
Pohl, J. F.....Minneapolis
Poirier, J. A.....Forest Lake
Pollard, D. W.....Minneapolis
Polley, H. F.....Rochester
Pollock, D. K.....Minneapolis
Pollock, L. W.....Rochester
Polmeteer, F. E.....Rochester
Polzak, J. A.....Minneapolis
Ponterio, J. L.....Shakopee
Pool, T. L.....Rochester
Popp, W. C.....Rochester
Poppe, F. H.....Minneapolis
‡Potek, David.....International Falls
Potter, R. B.....Minneapolis
Potthoff, C. J.....Minneapolis
Power, J. E.....Duluth
Powers, F. H.....Rochester
Prangen, A. D.....Rochester
Pratt, F. J.....Minneapolis
°Pratt, J. A.....Minneapolis
Pratt, J. H., Jr.....Rochester
Preine, I. A.....Minneapolis
Preisinger, J. W.....Renville
Prendergast, H. J.....St. Paul
Preston, F. W.....Rochester
Preston, P. J.....Minneapolis
Prickman, L. E.....Rochester
Priest, R. E.....Minneapolis
Priestley, J. T.....Rochester
Prim, J. A.....Minneapolis
Prins, L. R.....Albert Lea
Proeschel, R. K.....Willmar
‡Proffitt, W. E.....Minneapolis
Proshek, C. E.....Minneapolis
Proudfit, C. H.....Rochester
Pruitt, R. D.....Rochester
Pugh, D. G.....Rochester
Purves, G. H.....Lake Benton
Puumala, R. H.....Cloquet

Quanstrom, V. E.....Brainerd
‡Quello, R. O. B.....Minneapolis
†Quinby, T. F.....Minneapolis
Quist, H. W.....Minneapolis

Raadquist, C. S.....Hibbing
Radabaugh, R. C.....Hastings
Radcliffe, James, Jr.....Rochester
Raetz, S. J.....Maple Lake
Raihala, John.....Virginia
°Raiter, F. W. S.....Cloquet
Raiter, R. F.....Cloquet
†Ramsey, W. R.....St. Paul
Randall, A. M.....Ashby
Randall, L. M.....Rochester
Ransom, M. L.....Hancock
Rasmussen, R. C.....St. Paul
Rasmussen, W. C.....Rochester
Raszkowski, H. J.....Rochester
†Ratcliffe, J. J.....Aitkin
Rathbun, C. A.....St. Cloud
Raymond, J. H.....Canby
Rea, C. E.....St. Paul
Reed, C. A.....Minneapolis
Reeve, E. A. T.....Elbow Lake
Reff, A. R.....Crookston
Regnier, E. A.....Minneapolis
Reichelderfer, C. F.....Staples
†Reineke, G. F.....New Ulm
†Reiter, H. W.....Shakopee
Rempel, D. D.....Lester Prairie
Replogle, W. H.....Wabasha
Rewbridge, A. G.....Minneapolis
Reynolds, J. S.....Minneapolis
Rice, C. O.....Minneapolis
‡Rice, H. G.....Moorhead
Rice, H. R.....Roseau
Richards, E. T. F.....St. Paul
Richards, W. B.....St. Cloud
‡Richardson, F. S.....Fort Meade, S. D.
Richardson, H. E.....St. Paul
‡Richardson, R. J.....Rushford
Richardson, W. E.....Rushford
Richdorf, L. F.....Minneapolis
Rick, P. F. W.....St. Paul
Ridgway, A. M.....Annandale
Rieke, W. W.....Wayzata
Rigler, L. G.....Minneapolis
Rigos, F. J.....Rochester
Rimer, E. W.....Breckenridge
Ringle, O. F.....Walker
Rinkey, Eugene.....Redwood Falls
Ripple, R. J.....New London
Risch, R. E.....Minneapolis
Risser, A. F.....Stewartville
Risser, E. D.....Winona
Ritchie, H. P.....St. Paul
‡Ritchie, W. P.....St. Paul
Ritt, A. E.....St. Paul
Rivers, A. B.....Rochester
Rizer, R. I.....Minneapolis
Roan, C. M.....Minneapolis
Robb, E. F.....Minneapolis
Robbins, C. P.....Winona
Robbins, O. F.....Minneapolis
Roberts, L. J.....Minneapolis
°Roberts, L. M.....Little Falls
Roberts, O. W.....Owatonna
Roberts, S. W.....Minneapolis
Roberts, T. S.....Minneapolis
Roberts, W. B.....Minneapolis
Robertson, H. E.....Rochester
†Robertson, J. B.....Minneapolis
Robertson, P. A.....Austin
Robilliard, C. M.....Faribault
Robinson, F. J.....Rochester
†Robinson, J. M.....Corning, N. Y.
Robitshek, E. C.....Minneapolis
Rochford, W. E.....Minneapolis
Rodda, F. C.....Minneapolis
Roehlke, A. B.....Elk River
Roemer, H. J.....Winona
Rogers, C. W.....Heron Lake
Rogers, S. F.....St. Paul
Rogne, W. G.....Spring Grove
Roholt, C. L.....Waverly
Rohrer, C. A.....Waterville
Rokala, H. E.....Virginia
Rolig, D. H.....Howard Lake
Rood, D. C.....Duluth
Root, G. T.....Rochester
Rose, J. T.....Lakefield
Rosen, Samuel.....Minneapolis
Rosenberg, E. F.....Rochester
Rosenbladt, Louis.....St. Paul
Rosenfield, A. B.....Hibbing
Rosenholtz, B. I.....St. Paul
Rosenow, E. C.....Rochester
Rosenow, J. H.....Rochester
Rosenthal, F. H.....Grand Meadow
Rosenthal, Robert.....St. Paul
Rosenwald, R. M.....Minneapolis
Roskilly, G. C. P.....Minneapolis
Ross, A. J.....Minneapolis
Rossen, R. X.....Hastings
Roth, F. D.....Lewiston
†Rothrock, J. L.....St. Paul
Rothschild, H. J.....St. Paul
Roust, H. A.....Montevideo
Rowe, O. W.....Duluth
Rowe, W. H.....Fairmont
Rowles, E. K.....Coleraine
Roy, P. C.....St. Paul
Rucker, C. W.....Rochester
Rucker, W. H.....Minneapolis
Rud, N. E.....Two Harbors
Rudell, G. L.....Minneapolis
‡Rudie, P. S.....Duluth
Ruhberg, G. N.....St. Paul
‡Rumpf, C. W.....Faribault
Rumpf, W. H., Jr.....St. Cloud
†Rumpf, W. H.....Faribault
Russ, F. H.....Rochester
Russ, H. H.....Blue Earth
Russeth, A. N.....Minneapolis
Rusten, E. M.....Minneapolis
Rutherford, W. C.....St. Paul

Rutledge, L. H.....Detroit Lakes
Ryan, J. D.....Fairfax
Ryan, J. J.....St. Paul
Ryan, J. M.....St. Paul
Ryan, M. E.....St. Paul
Ryan, W. J.....Duluth
Rynearson, E. H.....Rochester

‡Sach-Rowitz, Alvan.....Moose Lake
‡Sadler, W. P., J.....Minneapolis
Saffert, C. A.....New Ulm
Sahr, W. G.....Hutchinson
St. Cyr, K. J.....Osseo
Saliterman, B. I.....Minneapolis
Salt, C. G.....Minneapolis
Salter, R. A.....Virginia
Samson, E. R.....Stillwater
‡Samuelson, L. G.....Mankato
Samuelson, Samuel.....Minneapolis
Sandell, S. T.....Oak Terrace
Sanderson, A. G.....Granite Falls
Sanderson, E. T.....Minneota
‡Sandt, K. E.....Minneapolis
Sandven, N. O.....Paynesville
Sanford, A. H.....Rochester
Sanford, J. A.....Farmington
Sarff, O. E.....Virginia
Sarnecki, M. M.....St. Paul
Satersmoen, Theodore..Pelican Rapids
Sather, Allen.....Fosston
Sather, E. R.....Alexandria
Sather, G. A.....Fosston
Sather, R. N.....McIntosh
‡Sather, R. O.....Crookston
Satterlee, H. W.....Lewiston
Satterlund, V. L.....St. Paul
Savage, F. J.....St. Paul
Sawatzky, W. A.....Minneapolis
Sax, S. G.....Duluth
Sayre, G. P.....Rochester
Scales, J. R.....Rochester
Schaaf, F. H. K.....Minneapolis
Schade, F. L.....Worthington
Schaefer, J. F.....Owatonna
Schaefer, Samuel.....Winona
Schaefer, W. G.....Minneapolis
Schamber, W. F.....Parkers Prairie
Schatz, F. J.....St. Cloud
Scheetz, R. J.....Rochester
Scheifley, C. H.....Rochester
†Scheldrup, N. H.....Minneapolis
Scherer, C. A.....Duluth
Scherer, L. R.....Minneapolis
Schiele, B. C.....Minneapolis
Schimelpfenig, G. T.....Chaska
‡Schleinitz, F. B.....Battle Lake
Schlesselman, G. H.....Anoka
Schlesselman, J. T.....Mankato
Schlicke, C. P.....Rochester
‡Schmidt, G. F.....Minneapolis
Schmidt, H. W.....Rochester
Schmidt, P. A.....Good Thunder
Schmidt, P. G., Jr.....Granite Falls
Schmidt, W. R.....Glencoe
Schmidt, W. R.....Worthington
†Schmidt, A. F.....Minneapolis
†Schmitt, S. C.....Los Angeles, Calif.
Schmitz, R. L.....Rochester
‡Schneider, H. H..Santa Monica, Calif.
†Schneider, J. P.....Minneapolis
Schneider, P. J.....Adams
Schneidman, N. R.....Minneapolis
Schoch, R. B. J.....St. Paul
Scholpp, O. W.....Hutchinson
Schons, Edward.....St. Paul
Schottler, G. J.....Dexter
Schottler, M. E.....Minneapolis
Schroder, C. H.....Duluth
Schroeppel, J. E.....Winthrop
Schuldt, F. C.....St. Paul
Schultz, J. A.....Albert Lea
Schultz, P. J.....Minneapolis
Schulze, A. G.....St. Paul
Schulze, W. M.....Swanville
Schunke, G. B.....Rochester
†Schussler, O. F.....Minneapolis
Schutz, E. S.....Mountain Lake
Schwartz, V. J.....Minneapolis
Schweiger, T. R.....Hibbing
Schwyzer, Arnold.....St. Paul
†Schwyzer, Gustav.....Minneapolis
‡Schwyzer, H. C.....St. Paul
Scofield, C. L.....Benson
Scott, E. E.....St. Paul
†Scott, F. H.....Minneapolis
Scott, H. G.....Minneapolis
Scott, F. M.....Shelbyville, Ind.
Sealy, W. B.....Rochester
Seashore, Gilbert.....Minneapolis
‡Seashore, R. T.....Duluth
Seefeld, P. H.....Rochester
Seham, Max.....Minneapolis

Seifert, M. H.....Excelsior
Seifert, O. J.....New Ulm
Seitz, S. B.....Barnesville
Seldon, T. H.....Rochester
Seljeskog, S. R.....Minneapolis
Sellers, G. K.....Dassel
*Selleseth, I. F.....Minneapolis
Senescall, C. R.....Sleepy Eye
†Senkler, G. E.....St. Paul
Senn, E. W.....Owatonna
Serkland, J. C.....Rothsay
Sessions, J. C.....Minneapolis
Sether, A. F.....Ruthton
Setzer, H. J.....St. Paul
Seybold, W. D.....Rochester
Shaleen, A. W.....Hallock
Shannon, S. S.....Ironton
Shannon, W. R.....St. Paul
Shaperman, Eva P.....Minneapolis
Shapiro, E. Z.....Duluth
Shapiro, M. J.....Minneapolis
Sharp, D. V.....Minneapolis
Sharpe, W. S.....Minneapolis
Shastid, T. H.....Duluth
Shaw, A. W.....Virginia
Shedlov, Abraham.....Fosston
Sheedy, C. L.....Austin
Shelden, J. T.....Rochester
Shelden, W. D.....Rochester
Shellman, J. L.....St. Paul
Shephard, V. D.....Rochester
Sheppard, C. G.....Hutchinson
†Sheppard, Fred.....Burien, Wash.
†Sheppard, P. E.....Hutchinson
Sher, D. A.....Hibbing
Sherman, C. H.....Stillwater
Sherman, C. L.....Luverne
Sherman, R. V.....Red Wing
Sherwood, G. E.....Kimball
Shick, R. M.....Rochester
Shillington, M. A.....Glendive, Mont.
Shima, G. J.....Sleepy Eye
‡Shimonek, S. W.....St. Paul
Short, Jacob.....St. Paul
†Shrader, J. S.....Springfield
Sidell, C. M.....Rochester
Siegel, Clarence.....Battle Lake
Siegel, J. S.....Virginia
Siegmann, W. C.....Minneapolis
Silver, Henry.....Sebeka
Silver, J. D.....Minneapolis
Simison, Carl.....Barnesville
Simison, C. W.....Hawley
Simons, B. H.....Chaska
Simons, E. J.....Swanville
Simons, J. H.....Minneapolis
‡Simons, L. T.....St. Paul
‡Simons, S. J.....Akeley
Simonson, D. B.....Minneapolis
Simonton, K. M.....Rochester.
Simpson, E. D.....Minneapolis
Sinamark, Andrew.....Hibbing
Singer, B. J.....St. Paul
Sinykin, M. B.....Minneapolis
Siperstein, D. M.....Minneapolis
Sisler, C. E.....Grand Rapids
†Sivertsen, Andrew.....Excelsior
Sivertsen, Ivar.....Minneapolis
Sjostrom, L. E.....Storden
Skinner, H. O.....St. Paul
Skjold, A. C.....Minneapolis
Slater, S. A.....Worthington
Sloan, Julius.....Minneapolis
Slocumb, C. H.....Rochester
*Slocumb, J. A.....Plainview
Sluder, F. S., Jr.....Rochester
Smalley, R. E.....Rochester
Smisek, E. A.....St. Paul
Smisek, F. M. E.....Minneapolis
Smith, A. E.....Minneapolis
Smith, Archie M.....Minneapolis
Smith, A. M.....Minneapolis
Smith, B. A.....Crosby
Smith, B. F.....Rochester
Smith, C. M.....Duluth
Smith, F. D.....Rochester
Smith, F. H.....Rochester
Smith, F. L.....Rochester
Smith, G. G.....Fulda
Smith, H. L.....Rochester
Smith, H. R.....Minneapolis
Smith, K. A.....Rochester
‡Smith, L. A.....Balaton
Smith, L. A.....Rochester
Smith, L. G.....Montevideo
Smith, Margaret I.....Minneapolis
Smith, M. W.....Red Wing
Smith, N. D.....Rochester
Smith, N. M.....Minneapolis
Smith, R. L., Jr.....Rochester
Smith, V. D. E.....St. Paul
Smith, W. R.....Grand Marais

‡Snell, A. M.....Rochester
Snyder, G. W.....St. Paul
Snyker, O. E.....Ely
Soderlind, R. T.....Minneapolis
Sogge, L. L.....Windom
Sohlberg, O. I.....St. Paul
Sohmer, A. E.....Mankato
Solhaug, S. B.....Minneapolis
Solsem, F. N.....Spicer
Sommer, A. W.....Elmore
Sonnesyn, N. N.....Le Sueur
Sorem, M. B.....St. Paul
Sorum, F. T.....Jasper
Souster, B. B.....St. Paul
Spang, A. J.....Duluth
Spang, J. S.....Duluth
Spano, J. P.....Minneapolis
Sperling, Louis.....Minneapolis
Spicer, F. W.....Duluth
Spink, W. W.....Minneapolis
Spittler, R. O.....New Richland
Sprafka, J. M.....St. Paul
Sprague, R. G.....Rochester
Spratt, C. N.....Minneapolis
Spurbeck, R. G.....Cloquet
Spurzem, R. J.....Anoka
Stafford, C. E.....Baudette
Standard, W. P.....Rochester
Stanford, C. E.....Minneapolis
Stangl, P. E.....St. Cloud
Stanley, C. R.....Worthington
Stark, F. M.....Rochester
Starekow, M. D.....Thief River Falls
Stebbins, T. L.....Minneapolis
Steffens, L. A.....Red Wing
Stein, K. E.....Lakeville
Stein, R. J.....Pierz
Steinberg, C. L.....St. Paul
Steiner, I. W.....Winona
Stelter, L. A.....Minneapolis
Stemsrud, H. L.....Alexandria
Stenstrom, Annette E. T..Minneapolis
Stephan, E. L.....Hinckley
Sterner, E. G.....St. Paul
Sterner, E. R.....St. Paul
Sterner, O. W.....St. Paul
Stevens, John.....Gonvick
Stevenson, B. M.....Fulda
Stevenson, F. W.....Faribault
Stevenson, W. D., Jr.....Quincy, Ill.
Stewart, Alexander.....St. Paul
Stewart, A. B.....Owatonna
†Stewart, D. E.....Grand Rapids
‡Stewart, N. E..Ft. Leonard Wood, Mo.
Stewart, R. I.....Minneapolis
Stickney, J. M.....Rochester
Stillwell, W. C.....Mankato
Stilwell, G. G.....Rochester
Stinnette, S. E.....St. Paul
Stocking, F. F.....Hallock
Stoesser, A. V.....Minneapolis
Stolpestad, A. H.....St. Paul
Stolpestad, H. L.....St. Paul
†Stomel, Joseph...Los Angeles, Calif.
Stout, H. A.....Rochester
Stover, Lee.....Rochester
Strachauer, A. C.....Minneapolis
Strand, E. V.....Bayport
Stransky, T. W.....Owatonna
Strate, G. E.....St. Paul
Strathern, C. S.....St. Peter
Strathern, F. P.....St. Peter
Strathern, M. L.....Gilbert
‡Stratte, A. K.....Pine City
Stratte, H. C.....Windom
‡Straus, M. L.....St. Paul
‡Street, Bernard.....St. Cloud
Strobel, W. G.....Duluth
Stroebel, C. F., Jr.....Rochester
Strom, G. W.....Rochester
‡Stromgren, D. T.....Minneapolis
Strout, G. E.....Minneapolis
Stuart, A. B.....Cloquet
Stuhler, L. G.....Rochester
Stuhr, J. W.....Stillwater
Sturre, J. R.....Minneapolis
Stuurmans, S. H.....Erskine
Sullivan, R. M.....Minneapolis
Sundt, Mathias.....Minneapolis
Sutherland, C. G.....Rochester
Sutherland, H. N.....Ely
Sutton, C. S.....St. Cloud
Sutton, H. R.....Hoffman
Sutton, Janet B.....Grand Rapids
Svien, H. J.....Rochester
Swanson, Cephas.....Minneapolis
Swanson, J. A.....St. Paul
‡Swanson, P. E.....Virginia
Swanson, R. E.....Minneapolis
Swanson, R. R.....Albert Lea
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‡Swedenburg, P. A.....Swanville

‡Sweetser, H. B., Jr.....Minneapolis
†Sweetser, H. B., Sr.....Minneapolis
Sweetser, T. H.....Minneapolis
Sweitzer, S. E.....Minneapolis
†Swendseen, C. G.....Minneapolis
Swendson, J. J.....St. Paul
Swensen, R. G.....North Branch
‡Swenson, A. O.....Duluth
Swenson, O. J.....Waseca
‡Sybilrud, H. W.....Bricelyn

Tanner, F. H.....Rochester
Tanquist, E. J.....Alexandria
Taylor, C. W.....Duluth
Taylor, E. S.....Worthington
Taylor, J. H.....Minneapolis
Teisberg, C. B.....St. Paul
‡Teisberg, J. E.....Middle River
Telford, V. J.....Litchfield
Tennison, W. J.....Arcadia, Calif.
Terrell, B. J.....Nopeming
Tesch, G. H.....Elk River
Thabes, J. A.....Brainerd
Thabes, J. A., Jr.....Brainerd
Thayer, E. A.....Truman
Thielen, R. D.....St. Michael
Thomas, G. E.....Minneapolis
Thomas, G. H.....Minneapolis
Thomas, G. J.....Minneapolis
Thompson, Albert.....St. James
Thompson, Arthur.....Cokato
Thompson, C. O.....Hendricks
‡Thompson, F. V.....St. Paul
Thompson, G. J.....Rochester
Thompson, V. C.....Marine-on-St. Croix
Thompson, W. H.....Minneapolis
Thomson, J. M.....Chicago, Ill.
Thoreson, M. O.....South St. Paul
Thornell, W. C.....Rochester
Thorson, E. O.....Luverne
Thorson, S. B.....Rochester
Throckmorton, T. D.....Rochester
Thysell, D. M.....Minneapolis
Thysell, F. A.....Moorhead
Thysell, V. D.....Hawley
‡Tibbetts, M. H.....Duluth
Tierney, C. M.....Harmony
Tifft, C. R.....St. Paul
Tilderquist, D. L.....Duluth
Tillisch, J. H.....Rochester
†Tinker, C. W.....Stewart
Tingdale, A. C.....Minneapolis
Tingdale, Carlyle.....Hibbing
Tinney, W. S., Jr.....Rochester
Tofte, Josephine B.....Minneapolis
Torgerson, W. B.....Oklee
Townsend, De Wayne.....Brooten
Tracht, R. R.....St. Paul
Traeger, C. A.....Faribault
Trandem, C. Elinor.....Rochester
Traxler, J. F.....Henderson
Tregilgas, H. R.....So. St. Paul
Treusch, J. V.....Rochester
Trimingham, H. G. L.....Rochester
Trommald, Gladys B. K.
Northville, Mich.
Troost, H. B.....Mankato
Trueman, H. S.....Minneapolis
Trutna, T. J.....Silver Lake
‡Trytten, E. G.....Middle River
‡Tudor, R. B.....Hibbing
Tunstead, H. J.....Minneapolis
Tuohy, E. B.....Rochester
Tuohy, E. L.....Duluth
Turnacliff, D. D.....Minneapolis
Tweedy, G. J.....Winona
Tweedy, J. A.....Rochester
Tweedy, R. B.....Winona
Twyman, R. A.....Rochester

Ude, W. H.....Minneapolis
Uhley, C. G.....Crookston
Uihlein, Alfred.....Rochester
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Underdahl, L. O.....Rochester
Undine, C. A.....Minneapolis
‡Urberg, S. E.....Duluth

Vaaler, Torvald.....Cannon Falls
Vadheim, A. L.....Tyler
Vadheim, J. L.....Rochester
‡Vail, J. B.....Henning
Valentine, W. H.....Tracy
Van Demark, R. E.....Rochester
Vandersluis, C. W.....Bemidji
Van Meier, Henry.....Stillwater
Van Valkenberg, J. D.....Floodwood
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Vezina, J. C.....Mapleton
Vik, A. E.....Minneapolis
Vik, Melvin.....Onamia
Vines, R. W.....Rochester
Virnig, M. P.....Wells
Vogel, H. A. L.....New Ulm
Vogel, J. H.....New Ulm
Von der Weyer, W. H.....St. Paul

Waas, C. W.....St. Paul
Wadd, C. T.....Janesville
Wagener, H. P.....Rochester
Wahlberg, E. W.....Sleepy Eye
Wahlquist, H. F.....Minneapolis
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Walch, A. E.....Minneapolis
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†Walker, A. E.....Duluth
Walker, A. E.....St. Paul
Walker, G. H.....Winona
Wall, C. R.....Minneapolis
Wallace, M. O.....Duluth
Wallace, W. B.....Rochester
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Walsh, M. N.....Rochester
Walsh, W. T.....Minneapolis
Walter, C. W.....St. Paul
Walter, G. F.....Farmington
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Webber, F. L.....St. Paul
Weber, H. M.....Rochester
‡Webster, L. J.....Battle Lake
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Williams, C. K.....St. Paul
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Wilmot, H. E.....Litchfield
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‡Wilson, J. A.....St. Paul
Wilson, J. V.....St. Paul
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Wilson, L. B.....Rochester
Wilson, R. H.....Winona
Wilson, V. O.....Minneapolis
Wilson, W. E.....Northfield
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Winer, L. H.....Minneapolis
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Winter, J. A.....Duluth
Winther, Nora M. C.....Minneapolis
‡Wipperman, F. F.....Minneapolis
Witham, C. A.....Minneapolis
Withrow, M. E.....International Falls
Wittich, F. W.....Minneapolis
Wohlrabe, A. A.....Minneapolis
Wohlrabe, C. F.....No. Mankato
Wohlrabe, E. J.....Springfield
Wold, K. C.....St. Paul
‡Wolfe, H. H.....St. Paul
Wolff, H. J.....St. Paul
Wolkoff, H. J.....St. Paul
Wollaeger, E. E.....Rochester
Wolner, O. H.....St. Peter
Wolstan, S. D.....Minneota
Woltman, H. W. F.....Rochester
Wood, H. G.....Rochester
Wood, W. W., Jr.....Rochester
Woodruff, C. W.....Chatfield
Woodworth, Elizabeth A.....Minneapolis
Woodworth, L. F.....Le Center
Workman, W. G.....Tracy
Wray, W. E.....Campbell
†Wright, C. D.....Minneapolis
†Wright, C. O.....Luverne
Wright, S. G.....Minneapolis
Wright, W. S.....Minneapolis
Wulf, R. F.....Rochester
Wunder, H. E.....Shakopee
Wyatt, O. S.....Minneapolis
Wynne, H. M. N.....Minneapolis
Wyrens, R. G.....Rochester

Yaeger, W. W.....Marshall
Yeager, C. L.....Rochester
Ylvisaker, R. S.....Minneapolis
Yoerg, O. W.....Minneapolis
Young, H. H.....Rochester
Young, T. O.....Duluth
Younger, L. I.....Winona
Youngren, E. R.....St. Paul

Zachman, A. H.....Melrose
Zachman, L. L.....St. Paul
Zaworski, E. A.....Minneapolis
Zemke, E. E.....Fairmont
Zierold, A. A.....Minneapolis
Zimmermann, H. B.....St. Paul
Zinter, F. A.....Minneapolis
Ziskin, Thomas.....Minneapolis
Zlatovski, M. L.....Duluth

PROCEEDINGS of the MINNESOTA ACADEMY OF MEDICINE

Meeting of March 11, 1942

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town & Country Club on Wednesday evening, March 11, 1942. Dinner was served at 7 o'clock and the meeting was called to order at 8 o'clock by the Secretary, Dr. Kenefick, both the President and Vice-President being absent.

There were forty-five members and one guest present.

Minutes of the February meeting were read and approved.

The Secretary read a letter of thanks from Dr. Donald McCarthy, expressing his appreciation for the action taken at the January meeting, in which the members voted to make Dr. McCarthy an Active Member without the presentation of a thesis in view of his Navy service.

There being no further business, the scientific program followed.

ECTOPIC PREGNANCY—AN ANALYSIS OF 102 CONSECUTIVE CASES

WILLIAM P. SADLER, M.D.
Minneapolis

Dr. Sadler, of Minneapolis, read his Inaugural Thesis on the above subject. Lantern slides were shown. (Complete paper to be published later).

Abstract

One hundred two proved cases of ectopic pregnancy were admitted to the Minneapolis General Hospital during the nine year period (1932-1940). Incidence in this hospital is one ectopic for every 174 intrauterine pregnancy.

A survey of the literature shows considerable variation in the total and operative mortality rates. The total mortality in 588 cases was 5.4 per cent and the operative mortality rate in 909 cases was 2.93 per cent. In this series we had a total mortality of 2.94 per cent and an operative mortality of 1 per cent. These favorably low rates are especially noteworthy because of the high percentage of cases admitted in shock. The average incidence of shock reported in the literature is 15 per cent. Twenty-eight (27.4 per cent) of our patients were in varying grades of shock, eight of these being practically moribund.

Definite diagnosis of ectopic pregnancy presents many difficulties. In cases collected from the literature, the percentage of correct diagnoses ranged from 37.5 to 84.7 per cent with an average of 64.6 per cent for 915 cases. In this series a correct diagnosis was made in 65.6 per cent of the cases.

One hundred of our patients were white. The age ranged from 18 to 43 years. Sixty-five or 63.7 per cent were in the decade 25 to 34 years. The number of pregnancies ranged from one to eleven. A period of relative sterility from six to seventeen years occurred in 26.6 per cent of our cases.

The duration of pregnancy in this series was 14 weeks or under in all cases except one secondary abdominal pregnancy at 8 months and one intraligamentous pregnancy at 20 weeks. Location was in the right tube 59 times and 42 times in the left. There were three interstitial pregnancies, (2.9 per cent). Intraligamentous pregnancy is rare. Its occurrence in five of our patients is extremely high.

Thirty-two (31.3 per cent) of our patients had undergone 38 previous laparotomies. This finding supports the observation that previous lower abdominal surgery contributes to the incidence of ectopic pregnancy. There was a low incidence of previous pelvic infection, 18.6 per cent confirmed histologically.

Eighty-nine of these patients had undergone 239 previous pregnancies. Of these, 170 delivered at or near term (71.13 per cent). The number of fruitful pregnancies, (71.13 per cent), is approximately that of the general population, (80 per cent). This indicates the fault is not with the fertilized ovum but the site of implantation. Five recurrent ectopics (4.9 per cent) in this series is high.

Abdominal pain was the predominant symptom. It occurred in 97.1 per cent of the patients. Vaginal bleeding was the next most common symptom. It was present in 76 per cent of our cases. Amenorrhea occurred in 70 per cent of the patients, twenty-four patients missed no periods. Shoulder strap pain was elicited in a high per cent (31 per cent). Abdominal distention in 36 cases is much higher than generally reported by others.

Immediate operation as soon as the diagnosis was definite was the usual procedure. Fifty-three patients were operated upon within one hour to less than twenty-four hours after admission. Expectant treatment is not recommended. Removal of the affected tube only was the operation of choice. Forty-five patients received eighty-two transfusions and there were three reactions (3.6 per cent). A reaction rate of the minor variety of 3.6 per cent compared to the generally estimated rate of 5 to 10 per cent shows that ectopics tolerate transfusion well. Reactions due to presence of intragroup agglutinins and anti Rh agglutinins recently emphasized in late pregnancy would seem not to be feared in early ectopic pregnancy.

The rate of blood sedimentation was markedly accelerated in cases with massive hemorrhage. Routine repeat hemoglobin and erythrocyte determinations proved valuable.

Two cases of tubal endometriosis were demonstrated histologically. Abdominal endometriosis in the upper angle of a previous operative scar was observed in one case.

Incorrect diagnoses can be materially lowered by proper interpretation of the history and evaluation of the clinical and laboratory findings.

Discussion

DR. J. C. LITZENBERG, Minneapolis: I suppose after what Dr. Sadler said, I ought to discuss this paper. There is one thing he has spoken about tonight that is worthy of particular significance, and that is their low percentage of proven previous tubal infections. That has been a question of controversy ever since the question of ectopic pregnancy has been discussed. His last remark about Lawson Tait is classical. But, in connection with that, one is impressed with the philosophy of the older clinicians. Everything that Lawson Tait did was reasoned out by a Frenchman—Dr. Donis. He figured out how ectopic pregnancy should be treated and the whole procedure which Lawson Tait afterwards advocated and confirmed was the philosophy of Donis. There is one classical remark by one gynecologist and obstetrician about the cause of ectopic pregnancy being due almost always to infection of the tubes with which he disagreed and closed his discussion by saying the more careful histologic studies are made in these cases the lower is the incidence of infection; most of them will be found not to be due to salpingitis. Dr. Sadler's percentage due to infection was low and proves that point, and also proves the other point that if these cases are examined histologically they will prove not always to be due to salpingitis; though, of course, some of them are.

As to the question of transfusion, I agree with Dr. Sadler, almost completely. I don't think it is a question of transfusion before, between or during operation, but a question of the time the transfusion is given before operation. The patient should not be transfused too soon before operation, else the transfused blood may be lost. The statement that ectopic pregnancy is a hemorrhagic tragedy sums up the whole thing. The patients are in shock from loss of blood and not from surgical shock. The source of that blood loss should be ligated in order to hurry along the recovery.

There are many things that have been controversial, but these few mentioned by Dr. Sadler are the result of careful analysis. One cause of ectopic pregnancy is salpingitis, but it is not the chief cause. I was reminded of a case I saw in consultation with Dr. Corbett. It was the most remarkable case I have seen in ectopic pregnancy. He had made a correct diagnosis of intraligamentous rupture, operated on her and found there was an intraligamentous ruptured ectopic pregnancy. He thought he better operate that woman extraperitoneally. He thought he cleaned out an ectopic pregnancy in the broad ligament. A few weeks later, when the patient came back to him and said she was getting bigger, he examined her and found she was pregnant—supposedly intra-uterine. Then he thought he had made an error in the diagnosis of the ectopic pregnancy. He watched her through her pregnancy and she came to labor. His diagnosis was correct. She had what is called a false labor and the baby died. I was called in consultation, and I said—you have an abdominal pregnancy. The intraligamentous pregnancy had terminated as an abdominal pregnancy. That was just at the time that the method of taking care of abdominal pregnancy was opening them up, taking out the baby, and leaving the placenta and then allowing it to slowly drain out. Then he had to operate on the woman another time because in the tract of the drainage the woman had a twisting of the tube around this and had a stoppage. He had to operate that woman four times.

A careful analysis from every point of view in over 100 cases of any kind is always of value.

DR. E. A. REGNIER, Minneapolis: I want to compliment Dr. Sadler on his analysis of these 100 cases. His discussion was well presented and brought out all the essential facts pertinent to these cases. The most striking of these facts is the low mortality rate. An operative mortality of 1 per cent in any field of surgery is remarkably low, but most significant in ectopic pregnancy. I believe Dr. Sadler will agree that the blood bank at the General Hospital is responsible, in a great measure, for saving the lives of some of these people. I believe that the low operative mortality in this series attests to the fact that diligence on the part of the House Staff and the operators has been well rewarded.

DR. R. T. LA VAKE, Minneapolis: I welcome the opportunity of congratulating Dr. Sadler on this most interesting and instructive thesis. All of us have developed our ideas as to the best approach to the diagnosis and treatment of this condition. I have only agreement and commendation for his conclusions.

Having had occasion to review the files of the Minneapolis General Hospital from 1915 on, it seems to me that before rupture one may expect an error of around 50 per cent in the accuracy of diagnosis, and an error of less than 25 per cent after rupture. The crux of the problem is surgical judgment as to which abdomen should be explored, if in doubt as to diagnosis, and which may be watched. As Dr. Sadler says, we should operate as soon as we are convinced that the history and signs point to a probable ectopic, and should be prepared for blood transfusion. The blood bank has improved tremendously the possibility of success in emergencies. The difficulty of a correct diagnosis is exemplified by the last three cases, in which, in multiple consultations, the diagnosis of ectopic was made. All gave a history of missing a period, spotting, excruciating pain and fainting, and showed slight enlargement and softening of the uterus, and showed a tender mass at the side of the uterus. In one instance under observation the hemoglobin fell 20 points. Two of the three diagnoses proved to be incorrect. One was a very early tubal pregnancy, one was a normal pregnancy complicated by appendicitis, and the other was a normal pregnancy complicated by adhesions from an old operation.

In my opinion, it should be stressed that where a suspicion of possible ectopic exists, a midline incision should always be made. The wisdom of this routine was brought home after watching a surgeon attempt to take care of an interstitial ruptured ectopic through a McBurney incision, used after a thorough study had convinced him that the diagnosis was appendicitis. If the possibility of ectopic exists, use a midline incision.

Now, as to the causes of ectopic pregnancies. It is obvious that any obstruction that will permit the entrance of spermatozoa, but not the egress of the enlarging fertilized ovum, may cause ectopic. In addition, it seems likely, from the phylogenetic history of the fertilized ovum and its usual place of final burrowing in, that, though the usual place of final burrowing is near the fundus, if the fertilized ovum were especially virulent proteolytically, it might burrow in before reaching the uterus; or, if especially weak proteolytically, it might be carried near the internal os before attachment, with the formation of placenta previa. From this standpoint, an ectopic may be regarded as the opposite extreme of the condition furthering placenta previa. This hypothesis is converged upon by the data furnished by those cases where, after an ectopic on one side, a woman successfully passes several fertilized ova through the remaining tube, thereby pointing to the normality of the remaining tube, and yet subsequently she has an ectopic in that tube. This hypothesis, whether correct or incorrect, has the merit of increasing vigilance in watching for an ectopic in the remaining tube. Furthermore, the inherent weakness of the developing fetus, arising from an ovum weak proteolytically, may account in part for the fact that, as compared with prematures of the same age, there is an increased fetal mortality among placenta previa prematures, even where hemorrhage has been slight and delivery has been by Cesarean.

DR. A. G. SCHULZE, Saint Paul: Somebody has referred to the pre-eclamptic and eclamptic toxemias of

(Continued on Page 412)

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pregnancy as a disease of theories. One can refer to ectopic pregnancy as being the disease of mistaken diagnosis. There is no other pelvic condition more frequently accused of being present when it is not, or of being overlooked when it is present. In a case where there are signs of rupture and intra-abdominal hemorrhage, the condition is easily diagnosed; but that variety of ectopic pregnancy which is lacking in striking symptoms is more difficult of diagnosis. Nor should one wait and refrain from making a diagnosis until the whole array of textbook symptoms are present. If speed is not an element in the diagnosis, it might be wise to resort to a Friedman test and see what that shows. It may be better to operate and make the diagnosis afterwards. With a midline incision, the whole pelvis can be explored and the appendix removed if need be. Many times the ectopic pregnancy is not on the same side as the one where the patient locates her symptoms.

DR. LITZENBERG: When was the blood bank established?

DR. SADLER: In the Fall of 1937. These cases fall into the group of six years before the blood bank and three years after.

DR. SADLER (in closing): I want to thank you gentlemen for your generous discussion. I may say to Dr. Regnier that, as I showed in Table I, the operative mortality in 900 cases is approximately 3 per cent. Availability of blood from the blood bank was instrumental in saving two of these women, who received 3600 cc. and 4000 cc. of blood respectively over a period of a few hours. Had we lost them, our mortality would have been 3 per cent instead of the favorably low 1 per cent.

Dr. LaVake brought up several points about the diagnosis of unruptured ectopic. He suggests 50 per cent of unruptured ectopics should be diagnosed—we were not that good. We had thirteen, and of these three were definitely diagnosed; in four, ectopic was suspected; and the diagnosis was missed entirely in six. This was the second admission to the hospital for two of these patients. Another point Dr. LaVake made is about operating for ectopic and finding out your diagnosis is incorrect. Unfortunately, with our system of filing at the General Hospital, it is almost impossible to dig out those cases and give the statistics. I think it would interest you to know that one case we incorrectly diagnosed as ruptured ectopic proved at operation to be a subcapsular rupture of the spleen with massive intraperitoneal hemorrhage.

Dr. Condit announced that Dr. Freeman, member and past president of the Academy, is ill in Abbott Hospital; and he felt the Academy should send him flowers. The Secretary was so instructed.

The meeting adjourned.

E. V. KENEFICK, M.D.
Secretary.

◆ REPORTS and ANNOUNCEMENTS ◆

MEDICAL BROADCAST FOR MAY

The Minnesota State Medical Association broadcasts weekly at 10:15 o'clock every Saturday morning over Station WCCO, Minneapolis, Station WLB, University of Minnesota, and KDAL, Duluth. Speaker: William A. O'Brien, M.D., Director of Postgraduate Medical Education, Medical School, University of Minnesota.

May 2—Encephalitis
May 9—Poliomyelitis
May 16—Kenny Method
May 23—Crippled Children
May 30—Dental Deformities.

A.M.G.A. GOLF TOURNAMENT

The American Medical Golfing Association will hold its twenty-eighth annual tournament at Seaview Country Club, Atlantic City, on Monday, June 8. Forty trophies and prizes will be awarded.

All male Fellows of the American Medical Association are eligible and cordially invited to become members of the American Medical Golfing Association. Write Executive Secretary Bill Burns, 2020 Olds Tower, Lansing, Michigan, for an application blank. Participants in the American Medical Golfing Association tournament are required to present their home club handicap, signed by the club secretary, at the first tee on the day of play. No handicap over thirty is allowed. Only Active Fellows of the American Medical Golfing Association may compete for prizes. No trophy is awarded a Fellow who is absent from the annual dinner.

JOINT MEETING OF WABASHA, WINONA SOCIETIES

The eleventh annual joint meeting of the Wabasha and Winona County Medical Societies was held April 13 at Buena Vista Sanatorium. Thirty-four persons attended the dinner, at which Dr. Robert A. Glabe of Plainview was toastmaster.

The program arranged by Dr. F. C. Welton, superintendent and medical director of the sanatorium, included the following medical papers:

"Local Manifestations of Constitutional Disease"—Dr. G. L. Loomis of Winona.

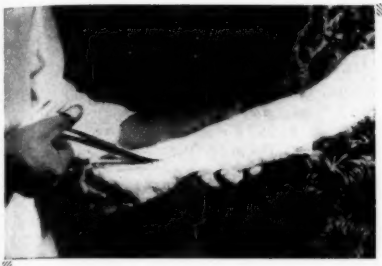
"Intrathoracic Tumors" (illustrated with slides)—Dr. T. J. Kinsella of Minneapolis.

Dr. H. Z. Giffin of Rochester, president of the Minnesota State Medical Association, addressed the societies on matters pertaining to public health and medical defense. He explained the functions of the Procurement and Assignment Service for Physicians, Dentists and Veterinarians.

WASHINGTON COUNTY

The monthly meeting of the Washington County Medical Society was held April 14.

After dinner, matters of local interest were considered, after which E. M. Jones, M.D., of Saint Paul gave an illustrated lecture on Periduodenal Hernias. This provoked many questions from the unusualness of this displacement, which were cheerfully and efficiently answered.



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MEDICINE—Two Weeks Intensive Course will be offered starting June 1st and October 5th. Two Weeks Course in Gastro-Enterology will be offered starting June 15th and October 19th. Two Weeks Intensive Course in Electrocardiography and Heart Disease starting August 3rd.

FRACTURES & TRAUMATIC SURGERY—Two Weeks Intensive Course will be offered starting June 29th and September 21st. Informal Course available every week.

GYNECOLOGY—Two Weeks Intensive Course will be offered starting June 15th and October 19th. One Month Personal Course starting August 3rd. Clinical and Diagnostic Courses every week.

OBSTETRICS—Two Weeks Intensive Course will be offered starting October 5th. Three weeks course starting August 10th. Informal course every week.

OTOLARYNGOLOGY—Two Weeks Intensive course will be offered starting September 14th. Clinical and Special Courses every week.

OPHTHALMOLOGY—Two Weeks Intensive Course will be offered starting September 28th. Five Weeks course in Refraction Methods Starting October 19th. Informal course every week.

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WOMAN'S AUXILIARY

MRS. JOHN J. RYAN, *President*
Saint Paul, Minnesota
MRS. L. R. BOIES, *Publicity Chairman*
Knollwood, Hopkins, Minnesota

Mrs. John J. Ryan, President of the State Auxiliary, desired that all counties inform her of any change in officers. Also, any Auxiliary members going to the American Medical Association convention in Atlantic City, should be sure to communicate with her regarding a delegate's card.

The revision committee composed of Mrs. John J. Ryan and Mrs. J. S. Reynolds, with Mrs. M. S. Henderson, as chairman, met April 14 to consider changes in the State Auxiliary constitution.

Last call for reservations for the Twentieth Annual Convention of the Woman's Auxiliary to the American Medical Association, to be held at Haddon Hall, Atlantic City, New Jersey, June 8-12.

Atlantic City extends a hearty welco··e to you!

County News

Stearns-Benton.—The regular dinner meeting of the Stearns-Benton Medical Auxiliary was held at Hays House, St. Cloud, Thursday, March 27. Mrs. P. E. Barringer presided. Plans for a post Easter card party were made and Mrs. J. P. McDowell was appointed to take charge. Out-of-town members present were: Mmes. S. H. Koop, Richmond, E. E. Keithohn, Kimball, and Joseph Barnett, Cold Spring. After the business meeting, the group attended an illustrated lecture on Vitamins given by Dr. J. J. Boehrer, University of Minnesota.

Goodhue.—The March meeting of the Auxiliary was held at the home of Mrs. H. Claydon, Red Wing. There was a rehearsal of the puppet show on Preventive Medicine. As a special project, it was voted to furnish a room at the Cannon Falls Tuberculosis Sanatorium. Mrs. L. E. Claydon assisted in serving the buffet lunch which followed.

Ramsey.—At the recent State Auxiliary Board meeting, Mrs. Mark Ryan gave a most interesting report of concentrated efforts in different phases of Red Cross work. To date the number of working hours members have put into this work includes the following:

Knitting, 2,650.
Nutrition classwork, 200.
Home Nursing Classes, 160.
Sewing, 1,115.
Surgical dressings, 2,255.
First aid class, 275.
Canteen work, 75.

Mrs. Edward V. Goltz was chairman of the entertainment committee for visiting women of the 26th annual session of the American College of Physicians held in Saint Paul April 20-24.

On Monday a welcoming tea was given at the University Club at which the Ramsey County Auxiliary was co-hostess, Mrs. Douglas Brand and Mrs. Harry Ghent representing the Auxiliary.

On Tuesday a luncheon and style revue was given at the Hotel Lowry and members and guests attended the entertainment in the evening furnished by the Ramsey County Medical Society in the theater of the municipal Auditorium.

On Wednesday a tour of the Radiation Therapy Department of the University of Minnesota was made in the morning, followed by luncheon at the Coffman

Memorial Union. The President's reception and dance was held at Hotel Lowry in the evening.

On Thursday a breakfast for members and guests was given at the Lowry Hotel, followed by a tour of the city. The annual banquet of the college was held in the ballroom of the Lowry Hotel in the evening.

St. Louis.—The March meeting of the Auxiliary took place at the Woman's Club.

Duluth medical women have gone a long way in doing their part in war work. They have contributed a remarkable amount of material and assistance in various forms of National Defense and International war relief since the latter part of last year. In coöperation with the Civilian Defense Council and the American Red Cross, the St. Louis Auxiliary helped institute a program to train women for actual defense occupations. The Women's Volunteer office was opened November 24 at 210 Alworth Building, under the direction of Mrs. D. W. Wheeler and seventy-five volunteer assistants. This office is maintained by the auxiliary members Mondays through Fridays from 10:00 a.m. to 4:30 p.m. and from 10:00 a.m. to 1:00 p.m. Saturdays, for women who wish to sign up for nutrition classes, motor corps, first aid, canteen corps, and as nurses' aides.

Hennepin.—The Auxiliary held its thirty-first annual post-Easter party Monday, April 6, to raise funds for its philanthropies. Contributions are given for Cancer Control work; to Sarahurst, a rehabilitation home for former tuberculosis patients; for the book fund at Glen Lake Sanatorium; and for a medical service fund which is used in isolated cases by Hennepin County Medical Society.

Mrs. R. S. Ylvisaker, chairman, and Mrs. M. H. Seifert, co-chairman, were assisted by the key women in the various units over the city. Because of the serious times, twenty-two units chose to contribute money, while five groups had parties. Considering everything, the undertaking was very successful.

Renville.—The regular meeting of the Renville County Auxiliary was held in Olivia, Tuesday, March 9.

State Board Meeting

The mid-winter board meeting of the Woman's Auxiliary was held Friday, March 20, at the Curtis Hotel in Minneapolis. County presidents and the different committee chairmen in attendance gave brief reports of their year's work.

A letter of resignation from Mrs. W. W. Moir, president-elect, was read. Mrs. R. J. Josewski, Stillwater, was elected to fill this vacancy. Mrs. J. R. Peterson, Minneapolis, was elected to fill the office of first vice president.

The nominating committee chosen by the assembly consists of the following members: Mrs. James Blake, Sr., Hopkins; Mrs. A. J. Bianco, Duluth; Mrs. Edmund W. Miller, St. Peter; Mrs. Harold Wahlquist, Minneapolis; Mrs. E. M. Hammes, Saint Paul.

The luncheon following the meeting was arranged by Mrs. J. M. Neal, Minneapolis. About forty were present. Dr. Ernest Lundy, Rochester, was the guest speaker and presented talks and film productions on "First Aid" and "Firebombs."

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OF GENERAL INTEREST

Dr. Frank Adair of Saint Paul, lieutenant in the United States Naval Reserve, went to San Diego, April 15, to report for active duty.

* * *

Dr. Northrop Beach, pediatrician, opened offices April 1 at 301 Kenwood Parkway in Minneapolis. He recently completed a fellowship at the University of Minnesota Hospitals.

* * *

Dr. Owen H. Wangensteen, head of the department of surgery at the University of Minnesota Medical School, presented a paper at the meeting of the American Surgical Association in Cleveland, April 6.

* * *

Dr. J. Allen Wilson of Saint Paul is stationed with the United States Navy in Philadelphia, having been called for active duty, March 30. Dr. Wilson holds the rank of lieutenant commander.

* * *

Dr. Earl R. Crow, who has been located at Arlington for the past thirteen years, has gone to Walker where he has accepted a position at the Ah-Gwah-Ching sanitarium.

* * *

Dr. H. T. Sherman who has been practicing at Kasson has moved to Zumbrota to take over the practice of Dr. Leon A. Schafer who has been called to active service in the army medical corps.

* * *

Dr. R. O. Quello of Minneapolis and Dr. Leslie A. Moren of Saint Paul left April 15 for a month's training period at Fort Ripley, Little Falls, with the Minnesota Defense Force. Dr. Quello is a major in the medical unit, and Dr. Moren, a captain.

* * *

Dr. Paul Kabler of the State Department of Health, Minneapolis, reported at Fort Sill, Oklahoma, April 1, to join the United States General Hospital Unit No. 26. Dr. Kabler, a captain in the Medical Corps, has been assigned to the Laboratory Service with the unit.

* * *

The marriage of Dr. George Howard Hall of Minneapolis, who is now in training at Fort Sill, Oklahoma, with the United States General Hospital Unit No. 26, and Miss Ruth Apitz of Hannock took place in Minneapolis, February 19. Dr. Hall is a first lieutenant in the Surgical Service.

* * *

Sons have been born to Dr. and Mrs. Lyle Hay (April 1), and to Dr. and Mrs. George Bergh (April 15). Dr. Hay and Dr. Bergh are both with the surgical service of the United States General Hospital Unit No. 26

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* * *

Speakers at the annual meeting of the Medical Society of the State of New York in New York City, April 27-30, included Dr. J. A. Bargen of Rochester, "Chemotherapy in the Digestive System," and Miss Elizabeth Kenny of Minneapolis, "The Technic of the Kenny Treatment of Acute Poliomyelitis."

* * *

Dr. Albert J. Chesley of Minneapolis, secretary and executive officer of the Minnesota State Board of Health, has been reëlected secretary and treasurer of the State, Territorial and Provincial Health Authorities of North America for his eighteenth term. The association met recently in Washington.

* * *

Dr. H. G. Rice of Moorhead, president of the Clay-Becker Medical Society and a member of the Sand Beach Sanatorium commission, has closed his office and entered military service. A lieutenant in the Navy Medical Corps, he reportd for duty at the Base Hospital at Bremerton, Washington.

* * *

A recent visitor at the home of Dr. Joseph Stratte of Hallock was his son, Dr. Paul Stratte, who was recently married. The latter went from Hallock to Fort Lewis, Washington, for special training before being sent overseas with a hospital unit composed of physicians from the County Hospital of San Francisco. He is a lieutenant in the Army Medical Corps.

Dr. Stuart W. Harrington of Rochester gave the fifth annual Hedblom Memorial Lecture at the University of Illinois College of Medicine, April 29. His subject was "Diagnosis and Surgical Treatment of Intrathoracic Tumors." The lecture was sponsored by Iota Chapter of Phi Beta Pi fraternity.

* * *

Several Minnesota men were guests of the Chicago Dermatological Society in Chicago, April 15. They included Dr. L. A. Brunsting of Rochester, Dr. Francis W. Lynch and Dr. John F. Madden of Saint Paul, and Dr. Henry E. Michelson, Dr. Louie H. Winer and Dr. Carl W. Laymon of Minneapolis.

* * *

Dr. William A. O'Brien, director of postgraduate education at the University of Minnesota Medical School, gave the banquet address at the annual meeting of the Iowa Public Health Association in Des Moines, April 13. He spoke on "Recent Advances in Public Health."

* * *

Dr. Glenn H. Leemhuis, physician at McGregor for the past several years, opened offices in Aitkin last month. He will move his family there.

Dr. John F. Kelly, who expects to be called into active duty with the Medical Corps soon, concluded his medical practice in Aitkin April 1 and returned to his home in Richmond. He had practiced in Aitkin since June 15, 1941.

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400 First National Bank Building Omaha, Nebraska

Dr. Frank E. Burch of Saint Paul discussed two papers, "Cataracts" and "Glaucoma" at the meeting of the Florida Society of Ophthalmology and Otolaryngology in Hollywood, Florida, April 13-15, held in conjunction with the annual session of the Florida Medical Association.

* * *

Dr. Elexious T. Bell, head of the department of pathology at the University of Minnesota Medical School, will present three lectures at the meeting of the Texas State Medical Society in Houston, May 11-14.

Dr. Bell delivered a graduate lecture under the auspices of the Polk County Medical Society in Des Moines, March 18. His subject was "Kidney Disease."

* * *

Participating in a series of regional war conferences sponsored by the American College of Surgeons is Dr. Harold S. Diehl of Minneapolis, dean of medical sciences at the University of Minnesota. He spoke last month at meetings in Portland, Oregon; San Francisco and Los Angeles as representative of the Procurement and Assignment Service for Physicians, Dentists and Veterinarians of the Office of Defense, Health and Welfare Services, of which he is a member.

* * *

Dr. Earl J. Black has opened offices for the practice of internal medicine at 1253 Lowry Medical Arts Building, Saint Paul, in association with Dr. Everett K. Geer. Dr. Black was a resident in medicine and assistant superintendent at the Ancker Hospital for a number of years. He will continue his association with the hospital in a part-time capacity as head of the outpatient department of the tuberculosis sanitarium at Ancker.

* * *

From the United States General Hospital Unit No. 26, now at Fort Sill, Oklahoma, for a training period, comes news of two weddings.

Dr. Robert Hebbel, major, and head of the unit's laboratory service, married Miss Beulah Agre, technician at the University of Minnesota Hospitals, February 27, at Fort Sill.

Dr. Stanley W. Lundblad, Minneapolis, and Miss Alice Lindquist were married February 26 at Fort Sill. Dr. Lundblad is a captain in the Medical Service.

* * *

When the California State Medical Association meets in Del Monte, May 4, 5 and 6, Dr. Wallace Cole of Saint Paul will present three papers. He will discuss the Kenny technique for treatment of infantile paralysis, fractures, and also war wounds.

Dr. Cole discussed the Kenny technique at two meetings in the East recently. He addressed the Westchester County Medical Society at White Plains, New York, March 17, and Group I of the American Academy of Pediatrics in Philadelphia, April 3.

* * *

A continuation course in obstetrical problems will be presented for physicians May 14, 15 and 16 at the University of Minnesota Center for Continuation Study. The course is under the auspices of the University Medical School, the Minnesota State Department of Health and the Minnesota State Medical Association.

A course in maternity and new-born nursing was presented for nurses at the Center, April 30-May 2, under the sponsorship of the Minnesota State Department of Health, the Minnesota Nurses Association, and the University Medical School.

* * *

Several University of Minnesota men participated in symposia at the American Physiological Society meeting in Boston, April 1-3. Dr. Maurice B. Visscher, head of the division of general physiology, discussed gastric secretions when he contributed to a symposium on "Mechanism of Secretion." Dr. George O. Burr, director of the division of physiological chemistry, discussed the significance of the essential fatty acids in another symposium; and Dr. Wallace D. Armstrong, also of that division, discussed the development of bones and teeth in a symposium on nutrition.

* * *

The Dakota County Medical Society met with officers of the Minnesota State Medical Association, Friday, April 10, in Saint Paul.

Officers elected at the meeting are: Dr. L. S. Burns, South Saint Paul, president; Dr. A. J. Edmond, Farmington, vice president; Dr. A. H. Field, Farmington, secretary-treasurer; Dr. L. D. Peck, Hastings, delegate; Dr. J. A. Sanford, Farmington, alternate.

* * *

Dr. Wesley W. Spink, associate professor of medicine in the Medical School, University of Minnesota, was elected to full fellowship in the American College of Physicians during its recent meetings in Saint Paul. Ordinarily full fellowship is granted only to doctors who have hitherto been associates of the college. Successful pioneering work in the use of new drugs, especially the sulpha compounds, led to Dr. Spink's election, it was announced.

* * *

Dr. Cecil J. Watson, director of the division of internal medicine at the University of Minnesota Medical School, will present several papers at the annual meeting of the Illinois State Medical Association in Springfield, May 19-21.

Dr. Watson also read a paper before the Association of American Physicians which met in Atlantic City, May 5-6. While in Atlantic City he attended sessions of the American Society for Clinical Investigation, as did Dr. Wesley W. Spink, also of the division of internal medicine.

* * *

The annual Medical Six O'clock banquet was staged Thursday, April 30, in the ballroom of Coffman Memorial Union on the University of Minnesota campus.

Sponsored by Incus, an organization of representatives of the student body, the dinner was for the entire medical school—faculty, students, alumni and their families. It is the only social function of the year at which the entire school gets together.

Toastmaster was Dr. William A. O'Brien, director of postgraduate education. Speakers included Dr. Law-

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rence R. Boies, Dr. Raymond Bieter, Dr. Wesley W. Spink, Dr. Winford P. Larson and Dr. Gordon R. Kamman.

Lester MacLean, Saint Paul, secretary-treasurer of Incus, was in charge of arrangements for the dinner.

* * *

Minnesota people who participated in the Second American Congress on Obstetrics and Gynecology at St. Louis, Missouri, April 6-10, included: Dr. A. L. Dippel, University Hospitals, who participated in demonstrations: Dr. Jennings C. Litzenberg of Minneapolis, who was chairman of a sectional meeting on Post-Graduate Education and Maternity Hospital Management; Dr. Robert D. Mussey, of Rochester, who conducted a round table discussion; Dr. Alex E. Brown, Dr. Stuart W. Harrington and Dr. Lawrence M. Randall of Rochester, and Miss Frances Hoffert, R.N., teaching supervisor in obstetrics at Minneapolis General Hospital, who presented papers.

Others who attended included: Dr. Viktor O. Wilson, Miss Adelia Eggestine and Miss Ethel McClure of the Division of Child Hygiene, Minnesota State Department of Health.

* * *

In the East to attend several pediatric meetings are five members of the University of Minnesota pediatrics department: Dr. Irvine McQuarrie, Dr. Arild E. Hansen, Dr. Albert V. Stoesser, Dr. Marguerite Booth and Dr. John A. Anderson.

On April 29, they attended the Society for Pediatrics Research which met at Skytop, Pennsylvania, Dr. Anderson presenting a paper on "Human Diabetes Insipidus," and Drs. Booth and Stoesser, a paper on bronchial asthma in children.

At the American Pediatrics Society meeting, also in Skytop, April 30 to May 2, Dr. Hansen gave a paper on the "Relations of Lipids to Eczema" and Dr. McQuarrie one on "Electrolyte Disturbances of Tumors of the Adrenal Cortex."

On May 4, the group was in Atlantic City for the meeting of the American Society for Clinical Investigation. Here Dr. Hansen addressed the meeting on "Relations of Fat Metabolism to the Nutrition of the Skin."

Dr. Hansen and Dr. McQuarrie will also attend the annual session of the American Academy of Pediatrics, May 13-15, in Cleveland. The latter will take part in a symposium on allergy, discussing "Metabolic Aspects of Allergic Disorders," and will also help to conduct special examinations for certification by the American Board of Pediatrics.

Hospital News

Wesley Sherman of Minneapolis is the new business manager of the Itasca Hospital in Grand Rapids. Mr. Sherman received his training at the University of Oklahoma, and his practical experience at the University Hospitals in Minneapolis under Ray Amberg.

* * *

Officers of the Glencoe Municipal Hospital in Glencoe were reëlected at the recent annual meeting. J. H. Holmes is president; William J. Harpel, vice president; Cedric Linville, secretary-treasurer.

Dr. H. H. Holm is head of the hospital staff; Dr. W. R. Schmidt, vice president; Dr. H. C. Goss, secretary-treasurer. Dr. A. R. Neumaier is a member of the staff.

Applications from the following physicians for staff membership were accepted: Dr. M. J. McMahon of Green Isle, Dr. Alvin M. Jensen of Brownton, Dr. J. D. Selmo and Dr. E. J. Eklund of Norwood, Dr. T. P. Martin of Arlington and Dr. T. J. Trutna of Silver Lake.

Miss Clara Draxton, hospital superintendent, reported on the purchases of equipment for the hospital.

* * *

Several members of the staff of the United States General Hospital Unit No. 26 whose orders were delayed have joined the unit in Fort Sill, Oklahoma. They include: Dr. Randall S. Derifield, captain, Medical Service; Dr. John D. Galloway, captain, Surgical Service; Dr. Paul Kabler, captain, Laboratory Service; Dr. Oscar Lipschultz, major, Dr. Jack Chalek, captain, and Dr. Eugene Ahern, first lieutenant, of the X-ray Service.

Continuation Course in Internal Medicine

Minnesota men who were registrants for the Continuation Course in Internal Medicine given April 6-18 at the University of Minnesota Center for Continuation Study were: Dr. Stanley T. Kucera, Lonsdale; Dr. Arnold Larson, Detroit Lakes; and Dr. Royal V. Sherman, Red Wing.

Guest members of the faculty included: Dr. Theodore L. Althausen, associate professor of medicine at the University of California Medical School; Dr. Alvin F. Coburn, assistant professor of medicine at Columbia University College of Physicians and Surgeons, New York City; Dr. Willis H. Fowler, associate professor of medicine, State University of Iowa, College of Medicine, Iowa City; Dr. Philip Levine, bacteriologist and serologist, Newark Beth Israel Hospital, Newark, New Jersey; Dr. Thomas T. Mackie, clinical assistant professor of medicine, Columbia University College of Physicians and Surgeons, New York City; and Dr. William S. Middleton and Dr. Elmer L. Sevringhaus, professors of medicine, University of Wisconsin Medical School, Madison.

Special events during the course included: the Hennepin County Medical Society lecture, April 6, at which Dr. Middleton spoke on "Some Rationalized Therapeutic Experiences"; the Minnesota Pathological Society annual lecture, April 7, given by Dr. Coburn on the subject, "Role of Hemolytic Streptococcus in Pathogenesis of Rheumatic Fever"; the Dight Institute lecture, April 10, at which Dr. Philip Levine spoke on "Serological Differentiation of Human Blood, Theoretical and Practical Considerations"; the Franklin R. Wright Memorial Lecture, April 14, at which Dr. Charles Huggins of the University of Chicago spoke on "Endocrine Relationships of Prostatic Carcinoma"; and the George Chase Christian Lecture on "Recent Trends in Cancer Research" by Dr. H. B. Andervont, principal biologist, National Cancer Institute, April 15.

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In Memoriam

Hallward Martin Blegen

Dr. Hallward Martin Blegen of Warren, Minnesota, died March 26, 1942 at the University Hospital, Minneapolis, at the age of fifty-six.

Dr. Blegen was born in Rochester, Minnesota, August 7, 1885. He graduated from Augsburg Seminary, Minneapolis, in 1904 and received his medical degree from the University of Minnesota medical school in 1909. After serving as interne at the Minneapolis General Hospital, he was city physician for Minneapolis from 1910 to 1912, and since 1916 had practiced in Warren.

Dr. Blegen had been president of the Warren Board of Education for the past twenty years. He also had been coroner of Marshall County, surgeon for the Great Northern and Soo Line Railroads, chief of staff of the Warren Hospital and a past president of the Red River Valley Medical Society.

Besides his wife, Clara, Dr. Blegen is survived by a daughter, Mrs. Bernard Gimmestad, Minneapolis; a son, Dr. H. M. Blegen, Jr. of Missoula, Montana; two sisters, Martha Blegen of Minneapolis and Anne H. Blegen, professor of French at Saint Olaf College in Northfield; and three brothers, Professor Carl V. Blegen of the University of Cincinnati; Theodore C. Blegen, dean of the graduate school of the University of Minnesota and John E. Blegen of Minneapolis.

Arthur Burns

Word has been received of the death of Dr. Arthur Burns on April 8, 1941. He was formerly a Fellow in Medicine in the Mayo Foundation.

Dr. Burns was born in Cuero, Texas, in 1896. He received the degree of M.D. in 1923 from Johns Hopkins University, and was an intern at the Bay View Hospital in Baltimore from July 1, 1923, to July 1, 1924. He was a Fellow in Medicine in the Mayo Foundation from July 1, 1924, to October 1, 1926, when he left to practice medicine at the Burns Hospital in Cuero.

He was a member of the American Medical Association, the Alumni Association of the Mayo Foundation, Phi Delta Theta and Phi Chi.

Approximately one person out of twenty-five has difficulty in *hearing* in the average auditorium, as compared with one out of 125 who has trouble in hearing a direct conversation.

A single *house fly*, if all of its descendants lived and bred, would be the ancestor of 2,000,000 flies at the end of one summer.

BOOK REVIEWS

Books listed here become the property of the Ramsey, Hennepin and St. Louis County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

NEUROANATOMY. Fred A. Mettler, A.M., M.D., Ph.D. Professor of Anatomy, University of Georgia School of Medicine, Augusta, Georgia. 476 pages. Illus. Price, $7.50. Cloth. St. Louis: C. V. Mosby Co., 1942.

In the Preface the author states that to the medical student it is impossible to form clear conceptions of microscopic neuroanatomy until he has a firm grasp of the gross aspects of the neural system. Part I, to which 164 pages are devoted, concerns "Gross Aspects of the Neural System." The text of the remaining pages, Part II, deals with "Microscopic Anatomy of the Neural System." The book contains 337 illustrations, 30 in color; these should prove very serviceable. There is a fifty-three page list of selected references, in addition to an author and subject index. The book deserves a favorable reception.

BUY WAR BONDS

(Continued from Page 377)

these may be purchased by associations and corporations as well as individuals. The F Bonds are twelve-year bonds which provide a return equivalent to an annual interest rate of 2.53 per cent. The smallest costs $18.50 and pays $25 in twelve years; the largest costs $7,400 and pays $10,000 at maturity. Bonds of Series G are sold at par in denominations from $100 to $10,000, and these bonds pay interests at the rate of 2.5 per cent throughout their twelve-year maturity period.

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MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

(Continued from Page 380)

Board of Medical Examiners, that he had performed a previous criminal abortion on the same girl in December, 1941, for which he was paid $50.00. He also admitted that he had performed at least seven or eight other criminal abortions during 1941, and had performed others prior to that time.

The defendant graduated from the Des Moines Still College of Osteopathy in 1913. He was licensed in Minnesota in the same year, and has practiced at Hutchinson for the past thirteen years. Prior to that time he practiced at Redwood Falls and Madelia. From 1937 to 1941 the defendant was also Judge of the Municipal Court at Hutchinson. The case has been referred to the State Board of Osteopathic Examiners for such action as they may decide to take in reference to a revocation of the defendant's osteopathic license.